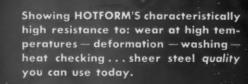
The ENGINEER

VETERAN OF OPERATIONS
SHELL PIERCING OPERATIONS
...WITH WEAR ONLY .004"

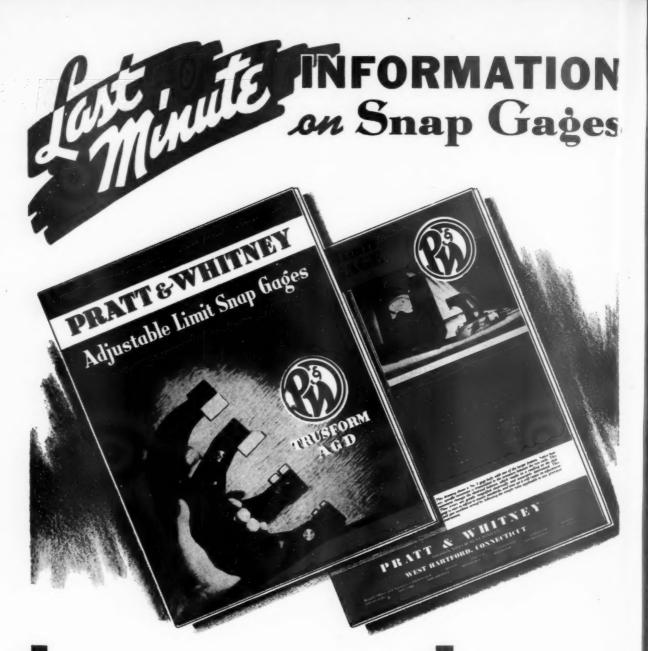
Typical HOTFORNI
performance on a vital defense job



TOPS IN TOOL STEELS



Vanadium-Alloys steel co. LATROBE, PA.



HESE precision gages are important factors in controlling fast moving production within close limits. This new circular, containing up-to-the-minute data on their use, is just off the press. A copy will be sent to any manufacturer requesting it on his company letterhead. Pratt & Whitney Adjustable Limit Snap Gages are saving many valuable hours by speeding up inspection.

E have included in this same circular information on the new PaW Electrolimit Snap Gage which provides fast, dependable inspection on parts requiring extra close accuracy.

PRATT & WHITNEY

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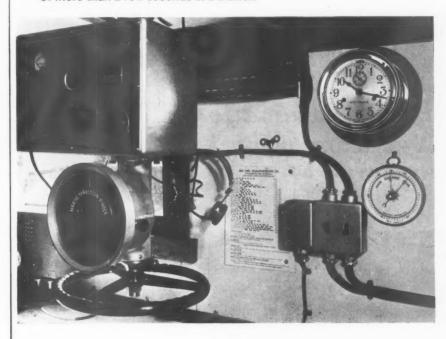
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Navigator's Room On Board a Patrol Ship

The MARINE CHRONOMETER shows 10 hours, 17 minutes, 23 seconds every 12 hours, with a regularity excluding errors of more than a few seconds in a month!



STANDARD GAGE CO., INC.

70 Parker Avenue Poughkeepsie, N. Y. Here is precision and uniformity of operation comparable to that of STANDARD DIAL INDICATORS. Every line on the dial actually represents one "tenth", —no variations allowed.

But while the chronometer runs continually in one direction only, Dial Indicators have to invariably maintain their precision under jerks in both directions. They are accurate and shock-proof.

Apply for circular.

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BOOTH E-26

NATIONAL METAL EXPOSITION PHILADELPHIA, PA. OCT. 20 THRU 24, 1941



See the unfolding of the HOLO-KROME STORY in an animated, dramatic manner...- Factory trained Sales Representatives in attendance



Stop in and see us . . . - BOOTH E-26

OCTOBER. 1941

Number 10

Articles

- Toronto Welcomes A.S.T.E. 56 New A.S.T.E. Board of Directors 58 New Method of Producing Threads 63
- Editorial
- Danger: Bursting Bubbles

Teatures

Handy Andy Says 93

News

ADVERTISERS' INDEX140



ARNOLD THOMPSON

General Chairman of the first international meeting of the A.S.T.E. which will be held in Toronto, Ont., October 16, 17 and 18. Arnold Thompson has been a National Director of the Society for two years and was chairman of the Toronto Chapter.

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National Business Papers Assn.

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Engineered Production







Bulletin



Booklet shown above tells all about Automatic Stub Lathe advantages, cycles, specifications. Write for your copy, today. Ask for Bulletin 391.





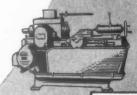
Like An Angleworm On Centers!

A Tough Job . . . Assembled in their bearings, the tough slender shafts shown above are "stout fellas". Between lathe centers they tend to wriggle like angleworms, which makes accurate turning quite a trick. Formerly, turning these shafts required two operations, two handlings, two machines, two operators. Straightening followed, and extra grinding on bearing surfaces. Rejects were numerous.

Sundstrand Does It . . . Now these shafts are turned complete on one machine, with one handling by one operator who does other work also. Straightening is unnecessary, grinding reduced, rejects practically eliminated. Sundstrand Engineered Production did the trick by equipping a Model 10 Automatic Stub Lathe for this job.

Here Is How... Nine tools work on this part, but first one of them turns a seat for a roller steady-rest which moves in automatically. Shaft is now turned all over in four minutes floor-to-floor. Engineered Production experience and Automatic Stub-Lathe adaptability is the winning combination on this job, as it is on thousands of others.

★ Automatic Stub Lathes and Rigidmils are booked ahead, but Sundstrand Engineered Production is available to develop most effective applications and tooling for future deliveries as they become available. Write us now about your prospective requirements on manufacturing turning and milling.



Model 12 Automatic Stub Lathe

Sundstrand Machine Tool Co.
2532 Eleventh Street, Rockford, Illinois, U. S. A.



Model 10 Automatic Stub Lathe





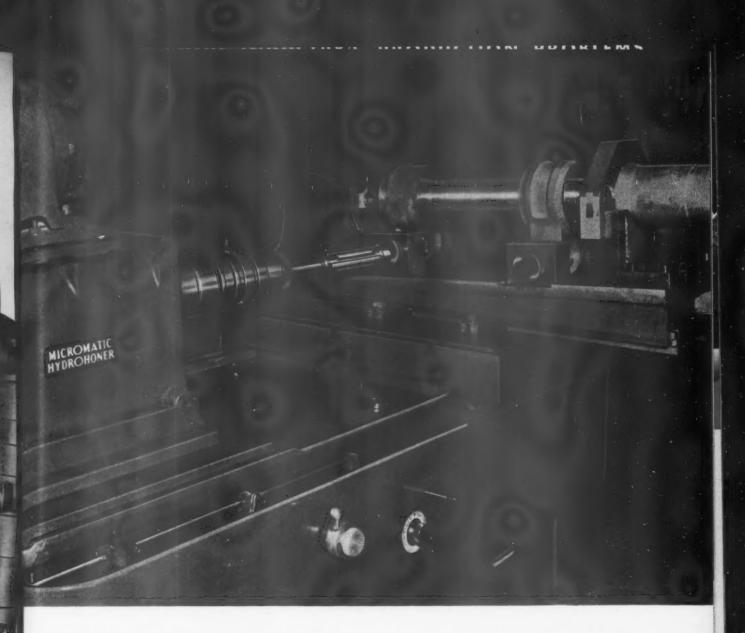
RIGIDMILS · STUB LATHES

Hydraulic Operating Equipment - Drilling and Centering Machines

MICROHONING



1355 Est Milwaukee



Oil chambers, cylinder bores and holes in assembly lugs of landing gear struts for Lockheed P-38 Interceptors are Microfinished to final size, geometric accuracy and surface accuracy with Microhones and Hydrohoners. This operation removes minute tool marks, insures a tight fitting assembly and eliminates the necessity for timeconsuming selective fits. In the photo above, a Micromatic Hydrohoner is shown in the plant of the Menasco Manufacturing Co. finishing holes in lugs to a tolerance of .0005". The Hydrohoner is equipped with a fixture that slides crosswise on an inclined surface to present the two lugs in line with the hone. From .001" to .0015" of stock is removed in this operation. In the photo at the left, taken in the same plant, Micromatic Hones with six abrasive stones are used for producing accurate finish on three diameters of the oil chamber and cylinder bore of the landing gear struts. Both rough and finish honing are performed on all three bores. The tool, simultaneously reciprocating back and forth and oscillating, removes from .005" to .006" of stock in the roughing operation and approximately .0005" in the final finish honing.

The automatic Micr-O-Size unit of Micromatic Hydrohoners makes honing within limits of .0002" to .0005" a completely automatic, accurately timed, high production operation. Visible dials speed set-up and adjustment. Expansion, pressure and collapse of the abrasive members is under synchronized mechanical and hydraulic control, quickly changed for variations in jobs. These features result in uniform accuracy and size, efficient stock removal, fine surface finish and thorough safety. Write for Bulletin AR-60.



How Industry is getting

Improved Tool Performance
with the Carpenter
Matched Set Method



ARE THESE 5 CARPENTER DEVELOPMENTS

Matched Tool Steels



So called because careful control of properties allows each steel to dovetail with the other, picking up its job where the other leaves off. It is because they are properly matched that the Carpenter Matched Set Method work so successfully.

Acid Disc Inspection



Announced by Carpenter in 1929 and regularly applied since that date to insure clean, sound, uniform tool steel.

Tough Timbre Control



Introduced in 1930 by Carpenter to provide you with an extra margin of safety in tool making and greater dependability in service.

Easy Identification



Only Carpenter Matched Tool Steels carry a label that clearly and quickly identifies the type of steel—its hardening characteristics—and its proper relation to the Matched Diagram. A time saver and a mistake preventer.

Correct Heat Treating Data



New, helpful, quick reference information constantly kept up to date to help you keep out of trouble and get improved tool performance. A new 160 page manual now available on request from your Carpenter representative.

MORE than 1500 metal working plants are cashing in today on the benefits of this simplified method of tool steel selection. Results are in the form of faster tooling, increased output per tool, and added capacity of tools and presses.

In 1935 the Matched Set Method was a revolutionary new idea—just as many other Carpenter developments have been—but quickly the idea "caught on" with the men responsible for tools. As more and more of these men discovered how tool performance could be improved—they began to adopt this new method in their tool rooms. Soon it became generally recognized that fewer tool steels properly matched could take the place of the hundreds of types formerly used.

Today, the Carpenter Matched Set Method is the standard pattern for simplified tool steel selection. But it has taken more than a pattern to achieve the outstanding results that are continually being credited to Carpenter Matched Tool Steels. Five important Carpenter developments each contribute their share to maintaining these results. (Note the five at the left.) Even under the pressure of national defense requirements, and greatly expanded mill facilities, Carpenter's vigilance over these safeguards has not been relaxed. We know, and you know, that only the best tool steel is good enough for defense needs.

THE CARPENTER STEEL CO. READING, PA.



Automatic
Pressure
Compensation



Adjustable
Overload Pressure
Protection

VICKERS "FLOW CONTROL AND OVERLOAD RELIEF VALVES"

Constant Flow
Rate Regardless
of Variation in
Fluid Pressure

This valve combines the functions of a flow control valve and an automatic relief valve. It will maintain a constant "metering in" flow rate (for a given setting of the control adjustment) regardless of any variation in imposed fluid pressure resulting from changes in work resistance. The pump operates only at the pressure required to do the work at hand. The relief valve is independently adjustable and limits the maximum system pressure to any desired value. Typical applications are to grinding machines, honing machines, shapers, fluid transmissions, etc. For complete information ask for the new Bulletin 40-22.

The Vickers "Flow Control and Overload Relief Valve" is another product of the Vickers program of continuous research and engineering development...a policy that always assures the high quality of Vickers Pumps and Hydromotive Controls.

Combined Functions Save Space and Simplify Installation



The Vickers "Flow Control and Overland Relief Valve" combines in one unit the means for accomplishing three independent functions:

- 1. Adjustable control or flow rate in the hydraulic circuit.
- 2. Adjustable overload pressure protection in the hydraulic system.
- 3. Remote "Start and Step" control when used with a suitable pilot valve.

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DETROIT, MICHIGAN





Oster No. 601 has hand operated, hand indexed, six position turret. Each turret face has six tapped holes for mounting various sizes of tool holders.

Spindle nose is No. 6-Al American Standard Flange Type ground to master gauges. T slots on cross slide permit mounting a variety of tool posts and fixtures.



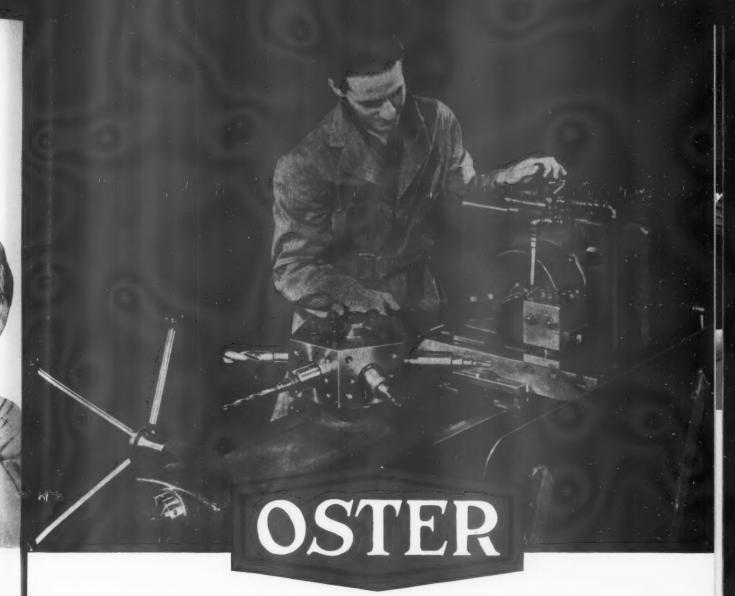


Close-up view of turret showing hardened, taper lock bolt and hardened taper lock bolt bushings. Saddle stops are automatically synchronized with revolution of turret.

Heavy forming cuts are made possible by the smooth flow of power supplied by the worm drive. Absence of vibration and chatter is noteworthy feature.



OSTER



NO. 601 TURRET LATHE

NEW Bar and Chucking Machine

What a break! What a break for you men with production headache! READ THIS:

- You can get delivery on the new OSTER No. 601 in 1941 if you order NOW!
- You can handle a wide variety of turret lathe work as efficiently as you can on more complicated, higher priced machines.
- You don't need highly skilled operators! OSTER No. 601 is easily understood, easily operated. It's a NATURAL for training new men rapidly, efficiently, safely.
- You can have the OSTER No. 601 to suit YOUR particular needs: Equipped with the hexagon turret (as illustrated) or with plain saddle and single tool post. No 601 is furnished with Worm Drive or Direct Drive, according to your requirements.

- 5 You can make unusually heavy forming cuts when the No. 601 is equipped with WORM DRIVE.
- You can get high speed work on small diameters and nonferrous metals when No. 601 is furnished with DIRECT DRIVE. (Spindle speeds up to 3000 R.P.M. are obtainable.)
- The price? Approximately \$500.00 less per machine on a point for point comparison with the nearest comparable machine of equal scope of applications.
- PERFORMANCE of No. 601 is proved beyond question!
 Hundreds are in action on vital defense work in important plants NOW.

ACT NOW! Wire, 'phone or write for illustrated catalog No. 27-A which explains full details. Or, ask us to have our nearest representative call at your plant.

Speed, Ease in Boring

VAN NORMAN PER-FECT-O

NOW AVAILABLE to all the metal-working industries is this precision Van Norman machine tool which has made a 12-year record in the automotive field as "the most profitable of all shop equipment" ... by reboring engine cylinders to factory-accuracy in one cut. Every Per-Fect-O Boring Bar has the same rugged, quality construction that distinguishes all Van Norman precision machine tool equipment.

The Per-Fect-O is easy to set up and operate.

All models are portable and can be readily taken

to the work or mounted on your fixtures for continuous production. The automatic stop frees the operator for other work while the bar is running. Exclusive "catspaws", shown at right, support the single flycutter with steady accuracy, prevent vibration and weaving. One of the 6 Per-Fect-Os, listed below will bring new speed, accuracy and economy to your boring work on all grades of cast iron, brass, bronze and aluminum. Write to the Van Norman MachineTool Co.(Department403)Springfield, Mass.

VAN NORMAN MACHINE TOOL COMPANY, SPRINGFIELD, MASSACHUSETTS

VAN NORMAN

Per-Fect-O Boring Bars

6 PER-FECT-O BORING BARS...FOR ALL DIAMETERS FROM 1.9" TO 9.050"

Model No.	Capacity	Depth	Speeds R. P. M.	Feeds Per Minute	Shipping Weight Approx.
943	1.900" to 3.810"	10"	355	15/8"	146 lbs.
944	2.2" to 4.260"	10"	344	13/4"	165 lbs.
965	2.600" to 5.250"	14"	285	13/4"	190 lbs.
777	2.6" to 5.343"	14"	High Low 375 220	2½" per m. 1½" per m.	200 lbs.
888-18	3.495" to 7.550"	18"	High Low 234 162	High Low 13/16" 27/32"	275 lbs.
999-30	4.350" to 9.050"	30′′	High Low 169 117	High Low 58"	355 lbs.

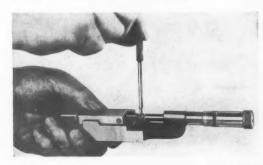
and Accuracy Cast Iron

BORING BARS

Exclusive Features



4 "CATSPAWS" (patented) are non-revolving, expansible and contractible supports which center the bar... then guide the cutter all the way down, preventing chatter, vibration and taper... assuring an accurate cut the first time, every time.



TOOL IS SET TO SIZE AWAY FROM
BAR with the special micrometer furnished...This means: greater convenience, no guesswork, no overcut or undercut.

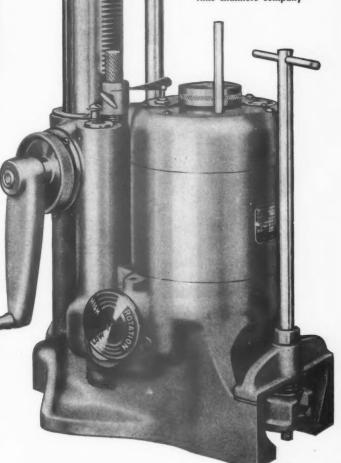


The Per-Fect-O Boring Bar will in many cases perform operations now requiring heavy and expensive Boring Mills.



Partial List of Users

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CRUCIBLE STEEL COMPANY of America CHRYSLER BUILDING, New York, N. Y.

Gentlemen:

AR-S41

Please send me a copy of the following Pamphlets.

REX MM	□ REX	VM		REX	тмо
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SEND FOR THESE Free Pamphlets

Crucible has prepared technical pamphlets on REX MM, REX VM and REX TMO containing complete heat treating data. Write for these pamphlets and have the facts on hand for ready reference.

MOLYBDENUM HIGH SPEED STEELS

Crucible can Help you!



ONE OF "ALL THREE"



RECOMMEND

To help you cooperate with O.P.M. General Preference Order M-14 (affecting the partial substitution of Molybdenum for Tungsten High Speed Steels), Crucible offers you the following three established grades.

REX MM (5.50% W, 4.00% Mo, 4% Cr, 1.50% V, .80% C), is the general-purpose substitute for REX AA and is recommended for lathe, planer and boring tools, reamers, hobs, milling cutters, drills and taps.

REX VM (8% Mo, 4% Cr, 2% V, .85% C), is primarily recommended for twist drills, taps, hack saws and slitting saws. It is also suitable for lathe, planer and boring tools, chasers, reamers, hobs and milling cutters. This grade contains no Tungsten.

REX TMO (1.50% W, 8.75% Mo, 3.75% Cr, 1.10% V, .80% C), is recommended for twist drills, taps, lathe, planer and boring tools, reamers, hobs and milling cutters.

Crucible knows Molybdenum High Speed Steels... and how to treat them. This knowledge comes from years of constant research and use . . . against the day when Molvbdenum High Speed Steels would be in urgent demand.

To help you get the most out of these Molybdenum steels—to help you heat treat them properly—Crucible invites you to call upon its nation-wide service organization, experienced representatives, technical engineers and metallurgists. They will gladly visit your plant, examine your equipment and recommend a heat treating procedure that should insure uniform, dependable performance.

"CALL CRUCIBLE" . . . today.

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Bethlehem's answer to the Tungsten shortage . . .

H-M HIGH SPEED STEEL

H-M HIGH SPEED tool steel is Bethlehem's answer to the present shortage in tungsten.

H-M High Speed will handle virtually any job formerly handled by 18-4-1... and turn in a comparable performance. In addition, H-M High Speed is less expensive to buy than the 18% Tungsten grades. However, since the analysis of H-M is so different from that of the 18-4-1 grades, this steel must be heat-treated and forged with particular care. Here are recommendations on its forging and annealing practice:

FORGING—Recommended forging temperature for H-M is between 1900 and 1950 deg. F., after a careful uniform heating and soaking. Large pieces should be thoroughly preheated at 1300-1500 deg. F., before heating more rapidly to forging temperature. Long soaking at forging temperature should be avoided because of decarburization. Decarburization may be retarded by sprin-

kling borax on the steel when it is at a temperature of approximately 800 deg. F. Use a steel plate to protect the furnace hearth from the corrosive action of the borax. Atmospheric control in the heating furnace will also prove helpful in preventing decarburization.

ANNEALING—Annealing should always follow forging. The recommended practice is to "pack anneal" in coke breeze, cast iron chips, or a mixture of dry silica and pulverized charcoal at about 1500 deg. F., thoroughly soak, and then furnace cool.

Get free H-M Booklet

A publication covering all details of handling H-M High Speed Steel is now being prepared. If you'll write in for this booklet, we'll send it within a few days. Address Bethlehem Steel Company, Bethlehem, Pa. No charge or obligation.

BETHLEHEM STEEL COMPANY





ILLINOIS (JEAR MEASURING BLOCKS



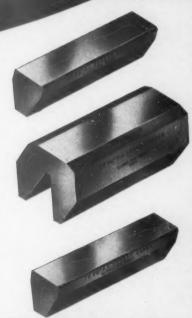
Provide a simpler, more accurate method for checking pitch diameter and tooth thickness

Gear measuring blocks are an engineering development of the Illinois Tool Works, designed to give industry a basically improved method of checking pitch diameter and tooth thickness of spur and helical gears.

The blocks are theoretical rack teeth of known proportions made to the exact pitch and pressure angle of the gears to be measured. Because they make contact all along the line of action, they always check the true pitch line condition of thickness and space.

Measuring blocks cannot rock or roll to distort the readings, or be affected by minor cutting depressions in the surface, and their flat top surfaces provide a solid seat for the micrometer anvils. Other advantages include greater ease of handling and use of a simple mathematical formula, all of which combine to allow rapid, accurate measurements.

A pamphlet illustrating and describing the application of the blocks is available on request.



Femished in sets of three, two males and one female.
Two male blocks are used on gears with an even
number of teeth, and the combination of one male and
one female on gears with an odd number of teeth.

ILLINIE

HIGH SPEED PRODUCTION TOOLS

Milling Cutters
Ground Hobs
Broaches
Shaper Cutters
Ground Form Tools
Special Tools
Die Filing Machines
Gear Measuring Machines

ILLINOIS
TOOL WORKS

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS

2501 N. KEELER AVENUE, CHICAGO, ILLINOIS . IN CANADA; CANADA ILLINOIS TOOLS, LTD., TORONTO, ONTARIO



A Guide to Better Fastenings! Shakeproof Products of

Shakeproof Products of ret definite assembly and performance features that he ip to lower costs and improve quality. This new data book shows you how to take advantage of these setter fastenings and achieve greater production efficiency,

FOR PURCHASING





FOR DESIGN ENGINEERS

Catalog No.42

READY SOON RESERVE

THE new Shakeproof Catalog No. 42 provides a complete and detailed presentation of all Shakeproof Products. Its one hundred and forty pages are filled with information and illustrations of special interest for design engineers, production managers and purchasing executives. Each Shakeproof product is described in detail and full engineering data is given. In addition, application suggestions and other technical material helpful in securing greater fastening efficiency has been included. Reserve your copy of this outstanding fastening data book by mailing a request on your company's station-

ery-copies will be distributed as soon as available.

SUINEPROOF INC.

FOR PRODUCTION MANAGERS

Distributor of Shakeproof Products Manufactured by ILLINGIS TOOL WORKS
2501 North Keeler Avenue Chicago, Illinois

Plants at Chicago and Elgin, Illinois
In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario
Foreign Licenses: Barber and Colman, Ltd., Brooklands, Manchester, England
Carr Fastener Co. of Australia, Ltd., Royal Park, South Australia

SEMS Fastener Units Lock Washers Locking and Plain Terminals Thread-Cutting Screws Locking Screws Spring Washers Radio and Instrument Gears Engineered Shakeproof Parts Special Stampings



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Tantalum - Tungsten Carbide Tools

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Call the nearest of these DISTRICT OFFICES:

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Journal Square 2-2231 NEW YORK AREA . . Worth 2-3923 PHILADELPHIA . Rittenhouse 8360 PITTSBURGH Atlantic 9699 PROVIDENCE Dexter 1271 ST. LOUIS Newstead 3110

SYRACUSE 3-0334

of VASCOLOY-RAMET TOOLS

With VASCOLOY-RAMET Tools, you can be sure of all the production of which your machines are capable-the maximum per grind, per tool, per hour, per dollar.

You can be sure of the finest grades of tantalum-tungsten carbide that science has developed—and VASCOLOY-RAMET experience goes back to the very beginning of carbide tools.

You can be sure of the integrity of a strong substantial source of supply, with nation-wide distribution and service facilities.

You can be sure of sound, practical, willing cooperation on problems of engineering and tool application.

Where you cannot use cemented carbide, use

the new Miracle Cutting Metal (not a steel, not a comented carbide) . . . most efficient at speeds about double those of high speed steel. Available in two styles and 65 standard sizes. Ask for information.

VASCOLOY-RAMET CORPORATION

NORTH CHICAGO, ILLINOIS

An Affiliate of

FANSTEEL METALLURGICAL CORPORATION and

VANADIUM - ALLOYS STEEL COMPANY

AUTHORIZED AGENTS IN PRINCIPAL CITIES

in Canada: Carbide Tool & Die Company, Ltd., Hamilton, Ont.

SUPERIOR TANTALUM-TUNGSTEN CARBIDE TOOLS

10

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is

nd gs



120 Hours a Week



MONARCH men...1500 strong...are keeping every available machine and production facility operating at maximum capacity—from 110 to 120* hours a week. And, Monarch assemblers keep pace... co-ordinating the endless flow of lathe parts (many of them machined in sub-contract shops) into the assembly lines. As a result, Monarch's production of lathes, this year, will be double that of 1940 ...5 times greater than that of 1939! The Monarch Machine Tool Co., Sidney, O.

MONARCH LATHES *

HOW TO HOB 4.257-5 PITCH SPIRAL PINIONS



ACCURATELY AND FAST WITH LOW HOB COST

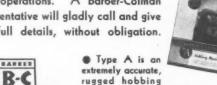
Done On A Barber-Colman Type A Hobbing Machine Using B-C Hobs

Spiral differential pinions having 16 teeth are hobbed in two operations by a leading axle builder. The net results are high production, fine accuracy, and low hob cost.

The gears are made of 4820 steel and have a 41/0" O.D. and 15/8" face. They are first rough hobbed three per load with an unground 2-thread hob, which nets 12 pinions an hour; then finish hobbed two per load with a ground single-thread finishing hob, producing 9 an hour. Total time per pinion, 11 min., 40 sec. Lead on finished pinions checks within 0.002"; teeth measure 4.710"-4.712" over 0.4375" balls.

You'll find the combination of B-C Hobbing Machines and B-C Hobs increasing production like this in many progressive plants — saving man-power and cutting

tool cost. Get these advantages for your operations. A Barber-Colman representative will gladly call and give you full details, without obligation.



COLMAN MACHINES, HOE SHAPPENING MA CHINES, REAMERS REAMER SHARP ENING MACHINES MILLING CUTTERS. SPECIAL TOOLS rugged hobbing machine that will give you consistently superior results on general purpose or production work up to 12" dia. and 4 pitch. Write, today, for your copy of Type A Bulletin 1099 containing a complete description.

There are efficient B-C Hobbing Machines for all work from precision instrument gears to work 14" in dia., and standard or special B-C Hobs for every job. Use Barber-Colman Complete Hobbing Service to speed accurate production and save.

This Job in Brief

Part - Differential pinion for axle, 4820 steel, not hardened.

Hobbing Machine - Barber-Colman standard Type A.

Operations - Rough and finish hob spiral pinions. Pinions have 16 teeth, 4.257-5 pitch, 1.625" face, 4.480" outside dia., 4.000" pitch dia., 20° pressure and helix angles. Conventional cut.

	Roughing Operation	Finishing Operation
Work-Holding	3 per load, on arbor.	2 per load, on arbor.
Hob	Class B, 2 thread, 4" dia. and length, 10 gashes.	Class A ground hob, single thread, 3½" dia. and length, 10 gashes.
Feed	0.060" per work rev.	0.060" per work rev.
Hob Speed	70 r.p.m.	82 r.p.m.
No. of Settings	4	3
Pieces per Setting	33	22
Pieces per Grind	132	66
Production	12 pinions an hour.	9 pinions an hour.

Remarks — Lead on finished pinions checks within 0.002", teeth measure 4.710"-4.712" over 0.4375" dia. balls. B-C Hobs are especially preferred for finishing "because they are more accurate".

Barber-Colman Company

General Offices and Plant 213 Loomis St., Rockford, Illinois, U. S. A.

The Right Bond Assures EXTRA GAGE LIFE

In reply to your letter of July 7, having reference to the .984" - .9844" Carboloy Plug Gage which you sent to us sometime ago for testing, would advise that we received 140,000 pieces checked at the grinder on this particular gage, and it shows wear 1/16" from the end, however, it is still usable. We are returning it herewith and would appreciate your checking it and returning it to us again with your reading.

Above is an excerpt from a letter from one of the country's best known bearing manufacturers. The gage mentioned was sent to this company in February, 1940, for the particular purpose of testing the efficiency of the bonding material.

In the manufacture of Carboloy plug gages, the bonding of cemented carbide bushings to steel shanks is extremely important. Any loosening of the bond during the service life of the gage invariably has an effect on its accuracy and usefulness.

More than a year and a half ago, Lincoln Park made extensive experiments to determine the most effective method of securing the right bond. The result was the adoption of a special bonding material inserted through drilled holes in the shank. A material of this type had never before been used for this purpose, and, to the best of our knowledge, Lincoln Park still is the only company using it in the production of cemented-carbide plug gages.

The practicability of this bonding material has now been thoroughly proven by extensive use of Lincoln Park Carboloy gages in many industries. In every case, the results experienced have been comparable to those stated in the above letter.

LINCOLN PARK TOOL and GAGE CO.
LINCOLN PARK, MICHIGAN

THE TOOL ENGINEER



• This war has taught the all-important lesson of mechanized speed—not only in the clash of arms, but

 $\operatorname{It'}_S$ clearly evident that old machine tools can no longer also in the battle for production. compete with modern methods and equipment. And that applies particularly to turret lathes. The new Gisholts, for example, are turning metals more easily, more accurately—and, on the average—from 30% to 60% faster

In the future, come war or peace, you'll have to reckon with this new speed and efficiency to keep step with than those of a few years ago! increasing production and lowering costs. If you are still

using 10-year-old turret lathes, it's time now to ask yourself: "How many tomorrows?"



Look ahead . . . been ahead . . . with Gisholt improvements in metal turning

WASHINGTON AVENUE

TURRET LATHES . AUTOMATIC LATHES . BALANCING MACHINES

HOW MACK TRUCK GOT 72 CARBOLOY TOOLS 6 WEEKS FASTER!



International-Plainfield Motor Company, Plainfleld, New Jersey, well-known manufacturers of Mack trucks, buses and fire apparatus, needed 72 Carboloy tools FAST . . . to bore two types of cylinder blocks.

Each tool was a special. Ordinarily that means a long period of waiting for deliveries under present conditions.

But Mack didn't wait! Instead they checked Carboloy Standard Tool specifications . . . found that their special requirements could be quickly adapted from Carboloy

standards. The above sketch shows three examples. The solid lines represent the tools they needed. The dotted lines show the Carboloy Standard Tools they ordered. Into Mack's tool room went these standards—to be quickly adapted

> to the special shapes required—then onto the job weeks ahead of the time required for delivery of specials.

May we help you get the same fast results? You always get standards faster than specials . . . and they are adaptable to 60%-80% of all turning, boring and facing jobs. Send for Catalog GT-129.

For Emergency Jobs Braze Your Own When a job must get under way fast—brase your own tools.

It's a simple, fast, three-step process. Get the facts. Write for booklet GT-133.



Style 100 Style 200 Available in two styles shown, 65 sizes in 3 grades.



CARBOLOY COMPANY, INC, 11145 E. 8 MILE AVE., DETROIT, MICH.

neral Electric Co., Ltd., Toronto, Canada

TOOLS & TIPS

STANDARD

You ALWAYS Get Standards FASTER Than 'Specials'



MACHINE OF THE MONTH

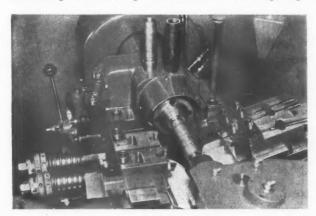
PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-swing PEOPLE" SENECA FALLS, NEW YORK

Lo-swing IMP LATHE FINISH TURNS 40 MM SHELL IN ONE OPERATION

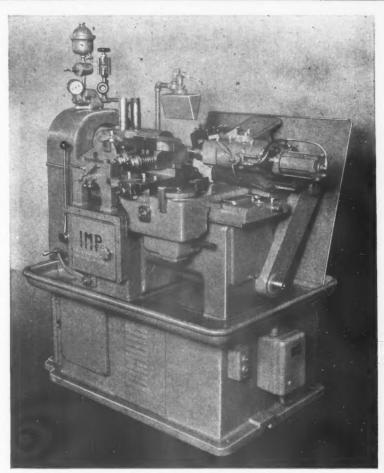
PROBLEM: To finish turn 40 mm high explosive shells, approximately 1.57" diameter x 5.17" long, maintaining close concentricity between O D and bore and obtaining an accurate, high-class finish.

SOLUTION: The Automatic Lo-swing IMP Lathe was chosen for this work for several reasons. First, its spindle construction with direct "V" belt drive provides

ideal structural design for turning with sintered carbide tools at the very high surface cutting speeds necessary to assure a polished finish. Secondly, Imp



Close-up of tooling with covers removed on template-controlled tool blocks to show construction. Note rough and finish turned pieces on headstock. Work is first drilled, reamed and ends rough bevelled on an 8-spindle automatic lathe before coming to the IMP.



design and method of fitting the carriage to the bed with a flat and "V" way, assures unusual rigidity and turning accuracy. Also the head and tailstock design is such that the carriage passes under them; thus the carriage has a bearing the full length of the bed.

The work is held and driven at the head end by an air-operated expanding collet chuck. The tailstock end is supported by a revolving, expanding bushing which enters the small diameter bore. The OD is turned the full length of the piece with 2 template-controlled tool blocks—finish turning the nose, the boat tail and the cylindrical body. Simultaneously, a 3-tool block on the automatic back squaring attachment faces and chamfers one end and machines the cartridge crimping groove.

Movements of both front and rear slides are synchronized and the machine stops automatically with tools and slides returned to starting position. The tailstock is air-operated to speed-up handling time.

LATHE NEWS from SENECA FALLS

Sunnen Precision Honing Aids Defense Production

In Time . No set up or locating time; removes stock rapidly; produces super-smooth finish. Low in initial cost (basic machine price In Dollars .

Saves skilled labor and training time-In Man Hours Saves skilled labor and training time—
any intelligent young man can learn to do precision work in 24 hours.

only \$195); economical to operate; requires only semi-skilled labor.

In Power

Uses only 1/3 h.p. — relieves internal grinders and other machine tools for other work.

Throughout the metal working industry the Sunnen Precision Honing Machine is being used by scores of plants working on defense contracts. One manufacturer is using 22 machines—several are using 14—half a dozen using 8 or more.

This practical, inexpensive machine solves five important problems:

- 1. Corrects errors of out of roundness and taper produced by previous operations
- 2. Produces super-smooth surface finishes.
- 3. Finishes internal diameters to close tolerances both as to roundness and straightness.
- 4. Maintains alignment established by. previous operations.

5. Provides simple, low cost, production method of duplicating sizes accurately.

Accuracy within .0001" guaranteed! Can be set up and ready to go in less than a minute! Range — internal diameters from .185" to 2.400".

Write at once for an 8-page bulletinor if you prefer a sales engineer will be glad to call and demonstrate in your plant on your job what this machine can do for you!

SUNNEN PRODUCTS COMPANY

7932 Manchester Avenue, St. Louis, Missouri Canadian Factory, Chatham, Ontario

Typical Uses



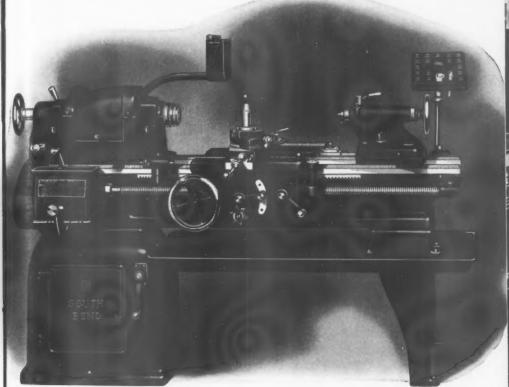






Precision Honing

For MODERN SHOPS



South Bend Lathes

SOUTH BEND LATHES are designed and built to give efficient service in modern shops. Because they are known to be dependable, permanently accurate, and versatile, thousands of them have been ordered for the National Defense Industries, the Army and the Navy—and prompt deliveries have been specified.

Production schedules have doubled and redoubled. Delivery promises have been met and are being met every day! South Bend Lathes are being made faster than ever before.

But no sacrifice in quality has been made to speed up the production of South Bend Lathes—nor will there be a lowering of our standards. The same rigid inspection tests—the same skilled workmanship—the same high quality materials will be maintained. South Bend Lathes are made in five sizes: 9",

10", 13", 14½" and 16" swing, 3' to 12' bed lengths, in Tool Room or Manufacturing types, with countershaft or motor drive. Write for a catalog and name of your nearest dealer.



SOUTH BEND LATHE WORKS

925 EAST MADISON STREET, SOUTH BEND, INDIANA, U.S.A

LATHE BUILDERS SINCE 1906





Back in 1883 . . .

The Lipe Heavy Universal Milling Machine

As early as 1883, Lipe engineers were fully alert to the modern industrial trend toward fast, multiple-part cutting of a wide variety of profiles on castings of steadily increasing size. Accordingly they pushed on ahead of the Lincoln and plain millers then in wide use, and produced the "heavy universal milling machine," shown in the American Machinist advertisement opposite.

A Development of LIPE Engineering and Mechanical Skill

oday

ENGRAVER ON WUOD

ST. W NEW YORK

Heavy

Universal

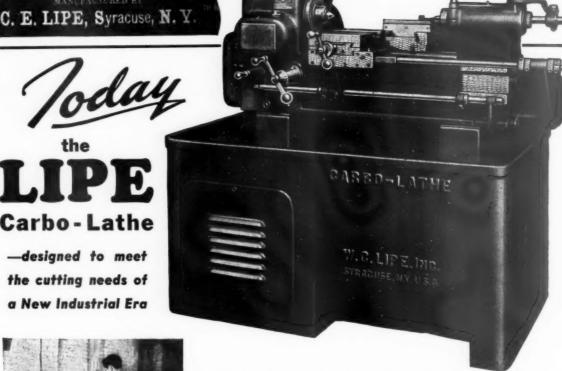
Milling

Machine.

Carbo - Lathe

-designed to meet the cutting needs of a New Industrial Era

Lipe Carbo-Lathe rough turning and facing a cast steel tool holder in the Grieder Ma-chine Tool & Die Company shop of Detroit. Production rate per machine and operator, 25 per hour.



 All-out mechanized warfare has put a new top speed on industrial production ... has set a pace that will carry over into peacetime competition. New lathes are needed...lathes with the rigidity, the smoothness of power and feed to "hog off" tough, high-alloy steels to "rough grinding" tolerances.

Lipe engineers were quick to see the possibilities in carbide and diamond-tipped tools. They built this super-fast, super-rigid Lipe Carbo-Lathe especially for these fast-cutting tools. It's a lathe with a new, non-distortion, trussed-box base—extra strength and extra massiveness to resist the stress of heavier cuts through tougher steels at higher speeds. And it has the high spindle speeds for efficient, low-cost turning of die castings, plastics and other fast-cutting materials. All with high economy of tool wear, tool breakage and part spoilage.

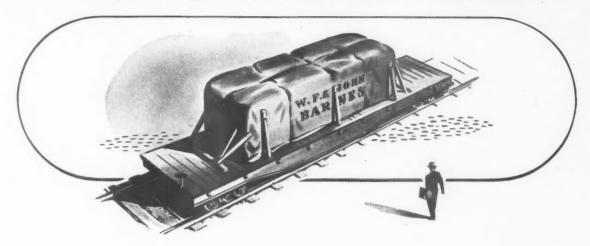
Lipe CARBO-LATHE not only boosts production rate, it actually gives more profit on the increased volume. Write now for specifications and detailed description.

W. C. LIPE, INC.

Syracuse, N. Y.

U.S.A.

Only for you...not John Doe too



• Under the canvas blanket of this flat car rests an idea. To any one but you it's a useless idea. Even your competitors couldn't use it. It's a new *machining method* made possible by the right machine design.



A simple machine licks a tough looking job

Snuggled inside this small cast-iron housing are two bosses on the same center, but on different levels. To back-face, by coming through the bore from the outside and attaching a facing tool, would be impractical because of the small bore. It would also be too slow.

The machine furnished is designed so that the casting can be slipped over the facing head and fed into depth by hand. Two stations are provided one for roughing and one for finishing. Both operations are performed simultaneously, resulting in a finished casting every 50 seconds.

You won't have to hunt up jobs for this machine. Its job is already cut out for it. You know exactly what it's going to do, and how much you are going to be able to save with it. You couldn't have bought it from a standard machine tool catalog, but you've been in on the designing of it and have had the chance to eliminate any "production bugs" that have annoyed you in the past.

To the left is an example of the results of our work with a prominent washing machine manufacturer. He didn't restrict the design of his washing machine by designing its parts to fit standard machine tools. He designed a

good washing machine and left the method of machining up to us.

Other examples of our work with various manufacturers are covered in our 3 Point Design bulletins...
Write for your copies.





This Gisholt No. 12 Hydraulic Automatic Lathe is equipped with a 12" diameter "LOGAN" Model 350-B Three Jaw Chuck and a Model R Rotating Type "LOGAN" Air

Jaw Chuck and a Model R Rotating Type "LOGAN" Air Cylinder. The "LOGAN" Chuck is designed to provide extra power and exceptional jaw rigidity in heavy duty chucking service. The "LOGAN" Double Acting Air Cylinder has a 10" bore and 1¼" stroke and is designed for the economical operation of air chucks required to be mounted on a revolving spindle. This heavy duty "LOGAN" equipment assures positive chucking and operating efficiency. "LOGAN" Representatives and "LOGAN" Engineers will be glad to make recommendations on your chucking problems.







THE HIGH SPEED MILWAUKEE MIDGETMILL GETS THE MOST FROM END MILLS AND MILLING MACHINES

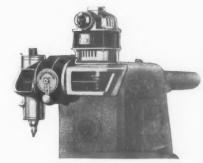
Get the most from end mills and milling machines — get the correct high speeds that mean smooth, clean, accurate work and long tool life. Adaptable to any milling machine — completely universal — mills, drills and bores — fast, safe and easy to set up — a necessity for the proper use of end mills — innumerable applications to work on dies, fixtures, templates, etc.

KEARNEY & TRECKER CORP., Milwaukee, Wis., U.S.A.

The "THOU-METER"

— exclusive with the Milwaukee Midgetmill. Set cutting tools by direct reading—merely touch tool to work, set dial at zero, and mill, drill and bore until dial shows correct reading—in thousandths. No graduations—dials—stops—binding screws.





The MILWAUKEE SPEEDMILL

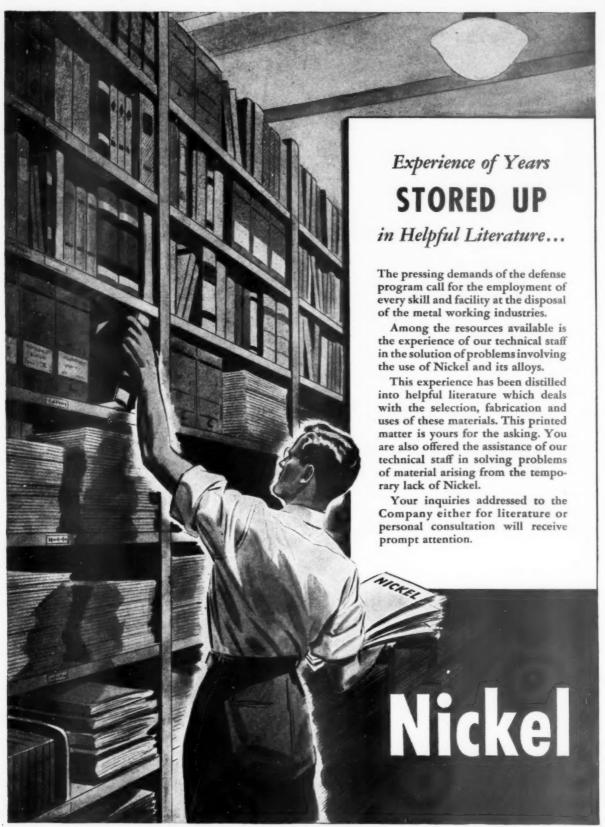
 for accurate end mill speeds up to 5300 rpm. Easy to operate, furnishes closer sizes and improved finishes
 adaptable to all types of milling machines.



Products of

Write now for complete information on the MILWAU-KEE MIDGETMILL and SPEEDMILL — built to the same quality standards as Milwaukee Milling Machines.

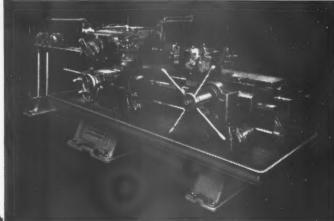
KEARNEY & TRECKER CORPORATION MILWAUKEE MILLING MACHINES



THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET, NEW YORK, N. Y.

No. 3 Jones & Lamson Ram Type Universal Turret Lathe with standard bar equipment





Bumps ahead for the little fellow-

APPLYING the "bits and pieces" principle to America's defense program promises to fill many a small plant to capacity — and beyond.

That's Bump No. 1.

If you operate a small plant and face the problem of adding new equipment, the question may come up: "Shall we install special machinery to handle defense work?" When normal conditions return, most special equipment can only be junked and written off your books.

That would be Bump No. 2 — and a rough one.

Then you would face the problem of equipping to meet the driving competition of a post-war world.

That would be Bump No. 3 — and the stiffest jolt of all

Plan now to smooth out these bumps and keep up your profits. See what versatile, long-lived, high speed, standard Jones & Lamson machine tools can do to help you fill your armament orders promptly and leave you in position to win and hold post-war business later.

It will not obligate you to put your problems up to Jones & Lamson engineers. Inquiries from small plants receive prompt attention here, and we may be able to help you over many of the bumps before you reach them.



PROFIT PRODUCING MACHINE TOOLS

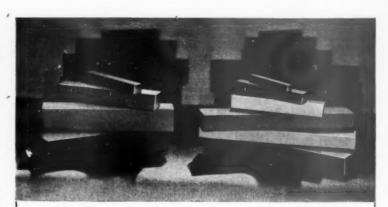
Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers.

JONES & LAMSON MACHINE CO. SPRINGFIELD, VERMONT, U.S.A.

For Quick Delivery and Smaller Inventory— Order Standard HAYNES STELLITE TOOL BITS

STANDARD Haynes Stellite tool bits are available for immediate delivery in a complete assortment of sizes—in both square and flat shapes. These solid bits can be readily converted to the various special cutting profiles required for different machining operations, so that any one size will serve for a wide variety of jobs. It is thus possible to hold your tool inventory at a minimum.

Also available for immediate delivery are Haynes Stellite standard welded tip tools which consist of a cutting tip of cast Haynes Stellite alloy welded to a tough steel shank. They can be used where solid bits are impracticable. Haynes Stellite standard milling cutter blades are also carried in stock for immediate delivery. Write or phone today for full information.



STOCKED FOR IMMEDIATE DELIVERY

Standard Star J-Metal and 2400-Metal tool bits are furnished in square and rectangular shapes ranging from 2 to 6 in. in length. These tools are finish ground with tolerances of plus 0.000 in., minus 0.005 in. on cross-sectional dimensions, and plus or minus $\frac{1}{8}$ in. on length. Sizes are listed below.

Standard Squar	e Sizes, inches	Standard Rectang	ular Sizes, inches	
3/16 sq. x 3 1/4 sq. x 2 1/8 1/4 sq. x 3 5/16 sq. x 2 1/4 5/16 sq. x 2 1/2 5/16 sq. x 3 3/8 sq. x 2 3/8 sq. x 2 1/2 3/8 sq. x 2 3/4 3/8 sq. x 3 1/2 3/8 sq. x 3 1/2 3/8 sq. x 3 1/2 1/2 sq. x 3 1/2 1/2 sq. x 3 1/2 sq. x 4	1/2 sq. x 4 1/2 1/2 sq. x 5 1/2 sq. x 6 5/8 sq. x 3 5/8 sq. x 3 1/2 5/8 sq. x 4 5/8 sq. x 4 5/8 sq. x 5 5/8 sq. x 5 3/4 sq. x 3 3/4 sq. x 3 3/4 sq. x 3 3/4 sq. x 4 3/4 sq. x 4 3/4 sq. x 5 3/4 sq. x 5 3/4 sq. x 5 3/4 sq. x 5 3/4 sq. x 6 7/8 sq. x 6 1 sq. x 5	3/16 x 3/4 x 4 1/4 x 5/16 x 1 1/2 1/4 x 3/8 x 2 1/4 x 3/8 x 6 1/4 x 1/2 x 4 1/4 x 1/2 x 6 1/4 x 1/2 x 6 5/16 x 1/2 x 3 5/16 x 1/2 x 6 5/16 x 1/2 x 6 5/16 x 1 x 4 5/16 x 1 x 4 5/16 x 1 x 4 5/16 x 1 x 4 5/16 x 1 x 6 3/8 x 1/2 x 2 3/8 x 1/2 x 3 3/8 x 1/2 x 3 3/8 x 1/2 x 4 3/8 x 1/2 x 6 3/8 x 5/8 x 3 3/8 x 5/8 x 4 3/8 x 3/4 x 6 3/8 x 3/4 x 6 3/8 x 3/4 x 6 3/8 x 3/4 x 6 3/8 x 3/4 x 4 3/8 x 3/4 x 4	3/8 x 1	The cutting ends of square bi are ground with a 7-deg, from clearance, and the gate ends square and regtangular bits a notched so they will not bused for the cutting edge.



HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation

New York, N. Y.

Kokomo, Indiana

Chicago-Cleveland-Detroit-Houston-Los Angeles-San Francisco-Tulsa

HIGH-PRODUCTION METAL-CUTTING TOOLS

Now More Important Than Ever! NORTON SERVICE

122/2/5

Local Stocks

In over 150 cities Norton distributors have grinding wheels on their shelves—service of stock wheels for the defense industries. Backing the distributor stocks are Norton branch warehouses in five industrial centers. Back of them are the immense stock rooms at Worcester and a factory organization geared to meet abnormal needs.

Field Staffs

Over 1800 distributors' representatives, coöperating with Norton field engineers and factory specialists, are ready to give you engineering service—can be especially helpful on your many grinding problems as you change from the production of regular products to defense products. A wealth of data on grinding in the defense industries has been compiled at Worcester—sent in by the field men everywhere for mutual use.

Trained Scientists

When some new defense product or material brings an entirely new grinding problem the Norton research laboratories are ready to help find the answer. A staff of over 50 trained scientists and technicians is constantly at work in well equipped laboratories that occupy over 45,000 square feet of floor space.

ENGINEERING

NORTON ABRASIVES

Maximum Life from Every Cutting Tool is Essential Today...

Sharpening High Speed Steel Tools?

First, specify the patented Norton "B-E" bond. Which one of the Alundum abrasives —regular, 38 or 57 —will depend on the type of

AND the grinding wheel is the key to maximum tool life. Sharpening and reconditioning done technically right assures every possible minute of useful life from your cutting tools.

Norton research has developed the correct wheels for every tool grinding job and Norton engineering service is ready to assist with the correct grinding methods.

Finishing Dies and Molds?

Nearly 200 standard shapes and sizes of Norton Mounted Wheels and Points to select from—fast cutting 38 Alundum abrasive, stainless steel spindles.



Sharpening Carbide Tipped Tools?

Use the strong, long-lived Norton metal bonded diamond wheel for single point tools; the Norton resinoid bonded diamond wheel for multi-blade tools such as milling cutters, end mills, reamers, etc.



177

NORTON COMPANY, Worcester, Mass.

- ☐ Please send "Norton Grinding Wheels for the Tool Room."
- ☐ Also your "Handbook on Tool Room Grinding."

Name

... Title.

Firm

Address

The booklet illustrated is a cor densed listing of some of the mos popular stock sizes and shape of Norton Wheels in the grain and grades commonly used for tool grinding.

Also available is a "Handbook on Tool Room Grinding"— 177 pages of practical information on grinding practice in the modern tool room.

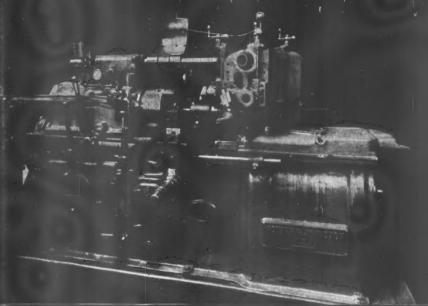
Send the coupon today for either or both publications.



NORTON ABRASIVES

Maximum output of BEARING CAGES..

WITH MAINTAINED ACCURACY..ON A



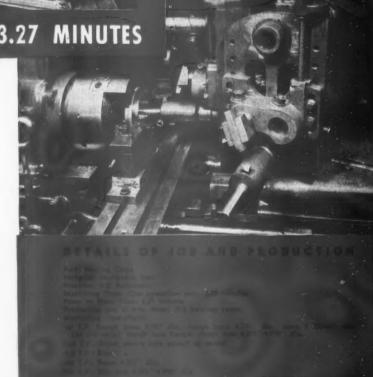
FLOOR TO FLOOR TIME · · 3.27 MINUTES

As in the larger P&J Automatic Chucking and Turning Machines, the design of the smaller 4-D Automatic has been developed to insure the extreme rigidity required to make use of present day cutting materials effectively.

The P&J 4-D Machine shown here has been equipped by P&J Tool Engineers to produce bearing cages to extremely close tolerances. The turning stem tool holders which carry a hardened and ground steel bushing, to receive the overhead pilot bar, in this case have adjustable blocks which cover a wide range of sizes, through the medium of a ball handle screw adjustment.

Of particular interest to production men is the fact that this form of construction can be used as a basis for the design of tools for P&J automatics whenever it is desirable to provide for a quick set-up from one size part to a similar one slightly larger.

Features of the P&J 4-D Automatic include: automatic speed and feed changes which assure maximum output; hardened and ground steel ways on machine bed and turret slide; automatic binding of turret after indexing; spindle mounted on Timken tapered roller bearings; an overhead pilot of extreme effectiveness.



POTTER & JOHNSTON MACHINE CO.

Pawtucket, Rhode Island



BASIC FACTS ABOUT PRINT MAKING YOU SHOULD KNOW

AN OZALID TRANSPARENT DUPLICATE CAN BE CHANGED AND CORRECTIONS ADDED TO THE SAME PRINT IN EITHER PENCIL OR INK. Subsequent prints will show all the changes . . . the original remaining

Changes and additions are made quickly on a transparent duplicate either by using Ozalid Corrector Fluid for incidental or scattered changes, or the Ozalid "blockout" method for major corrections, Both eliminate the necessity of complete retracing and provide short cuts in drafting.

The corrected transparent duplicate produces prints at a speed 3 to 5 times faster than is possible with a Van Dyke negative. The prints are permanent . . . free of distortion . . . and the changes true-to-scale.

Ozalid transparent materials include a variety of papers, cloth and foils, any of which may be used as a duplicate original for making subsequent work prints. This enables you to file your valuable originals and keep them safe from wear and tear.

This is the second of a series of facts on modern print making. Watch for Fact No. 3.

that combine exposure and dry development in one compact unit.

By using the Ozalid Process, you get-in a matter of seconds-positivetype whiteprints of engineering drawings or anything written, typewritten or drawn on reasonably translucent paper . . . prints that are true-to-scale, durable, and will not wrinkle or curl.

With this all-purpose process you get ... SUCH STANDARD MATERIALS as papers producing black, blue or maroon lines on a white background ... transparent materials including transparent papers, cloth and foils . . . SUCH SPECIALTIES as paper laminated on cloth . . . airmail weight paper ... paper coated on both sides ... opaque cloth ... correctors for eradicating line detail . . . SUCH SERVICE as fast—economical—print making.

Ozalid whiteprints are made simply by placing the original on a piece of Ozalid sensitized material and feeding both into the machine. Exposure and dry development are combined in the machine to produce a finished print that is dry, ready for immediate use. Ozalid transparent duplicates are produced the same simple way.

Compare this quick, complete process with the indirect way of making blue prints which requires washing—fixing—drying and trimming. Eliminate unnecessary production tie-ups by installing an Ozalid machine. Write for illustrated literature today.



★ See the OZALID EXHIBIT at the METAL SHOW in PHILADELPHIA... BOOTH H-26

OZALID PRODUCTS DIVISION

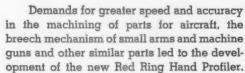
GENERAL ANILINE & FILM CORPORATION JOHNSON CITY, N.Y.

Ozalid in Canada . HUGHES OWEN CO. LTD., Montreal

RED RING PROFILER







The operating principle is that of accurately guiding the travel of an end mill in order to duplicate the profile of a master pattern. To do this, both head and table are mounted on slides each actuated by its own hand wheel. Manipulating these hand wheels keeps the former pin in contact with the master form and guides the tool.

Both head and table respond instantly to finger-tip pressure on their respective hand wheels. This has been accomplished by careful distribution and balancing of the weight, by mounting both these elements on large diameter roller bearings and by the use of hardened and ground slides.

PRINCIPAL SPECIFICATIONS

Maximum table travel 10" each way from center.

Maximum head travel 4" each way from center.

Maximum distance end of spindle to table 81/4" (without riser).

Maximum Spindle travel 31/2".

Distance between cutter and former pin 41/8".

Table and head actuated through helical gears and racks.
Adjustable stops on head and table for rectangular cuts
without use of master form.

Two 1 H.P.—1200 spindle motors—One 1/6 H.P. 1800 coolant motor.

28 spindle speeds, 400 min.-3600 max.

No. 9 B. & S. Taper in spindles.

End mills up to 3/4" diameter.

Take up adjustments on all slides.

Distance former pin to spindle axis adjustable.

• Write Red Ring engineers for further details. •

NOTE: The illustrations show special application for extra long work, Standard machine is furnished with former pin to right of each spindle,

NATIONAL BROACH AND MACHINE CO.

5600 ST. JEAN

DETROIT, MICHIGAN



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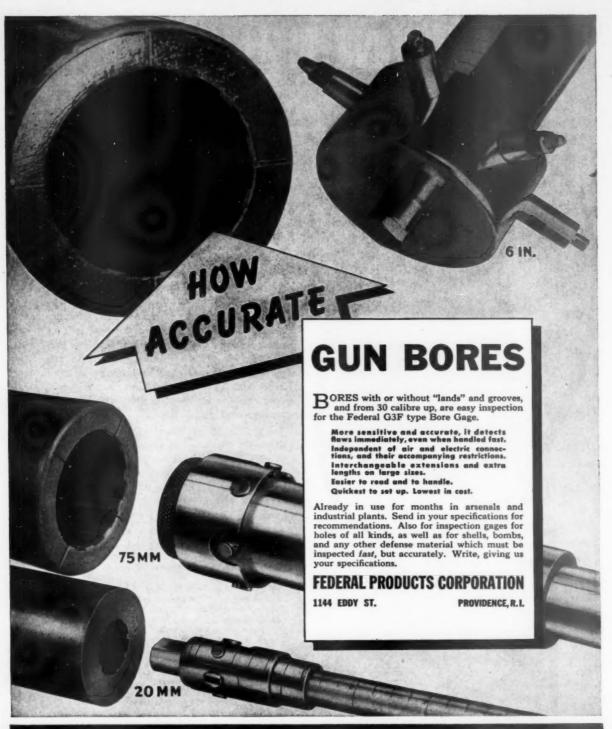
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FEDERAL

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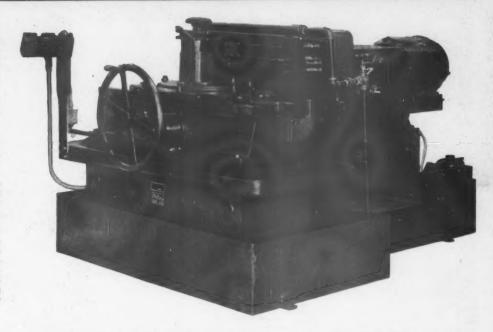
BAKER

illustrating a new arrangement of BAKER SA12 self-centained hydraulic feed unit with multiple head with cross index table for multi-operation.

Part handled—Air craft engine magnesium casting.

Operation — Multiple drill, ream and countersink 15 holes in governor pad.

The heles which are drilled, reamed and countersunk are at close center distance within an area of 5" by 6". Due to close center distance of holes, it is necessary to split the drilling and reaming operations. Machines handles the drilling at two stations, the reaming and countersinking at two stations.



To meet the present day demand for increased production in the aircraft industry we are prepared to furnish not only vertical type multiple spindle machines, but horizontal unit type machines as well. We illustrate a one-way hydraulic unit horizontal type machine with multiple head with a hand operated cross indexed fixture for giving the increased output demanded and at low labor costs.

The illustrated machine is novel due to the fact that the operator, in his normal operating position, stands at end of machine allowing for convenient loading and unloading of part.

Particular care has been emphasized in the designing of this special tooled machine for convenient operation. Note the mounting of push-button or electrical control convenient to operator.

Fixture is mounted on hand traversed table, which table is mounted on hardened steel ways.

Part handled is chucked over the center plug and located from male diameter on part with radial location from dowel pin with quick acting clamps on top.

We offer our self-contained hydraulic feed unit for application not only for one-way horizontal machines as shown, but for two-way, three-way or four-way horizontal application as well as vertical and angle mounting.

"Our Motto Since 1867:

"MACHINES: STURDY AND EFFICIENT, AS FINE AS CAN BE BUILT"

BAKER BROTHERS, INC., TOLEDO, OHIO, U.S.A.

Rugged...Simple...Efficient



Wide spindle speed range with only two gear contacts motor to cutter

Independent adjustment of feed rate for opposite directions of table travel

Write for Bulletin . . .

Kent-Owens Machine Company, Toledo, Ohio

Call on

KENT-OWENS

for MILLING MACHINES



ABRASIVE WHEELS

... FOR Lectsion GRINDING

Superior finishes, closer tolerances and faster production . . . these are yours with ABRASIVE COMPANY GRINDING WHEELS on your precision grinding machines.

The careful specification of the grain and grade combination best suited to your work enables your operators, following modern grinding practice, to get the most out of your grinders . . . and that means more pro-

duction and improved quality of work.

Tool rooms, machine shops and metal-working production lines can benefit by applying ABRASIVE Wheels to their grinding jobs now when quality as well as quantity of production is so important.

New men in industry concerned with grinding can learn much from our 112 page Grinding Wheel Data Book containing complete operating data and specification tables. Copy sent on request. Available to others, also.

ABRASIVE COMPANY

Division of Simonds Saw and Steel Company, Tacony and Fraley Sts., Philadelphia, Pa. ELECTRIC FURNACE PLANT: ARVIDA, QUEBEC, CANADA • CHICAGO BRANCH: 127 S. GREEN STREET

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Adapted to many press operations and designed for simple handling and control

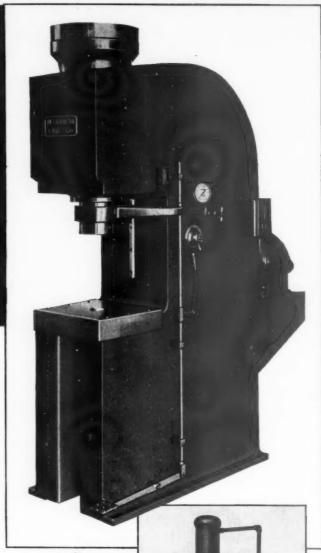
These recent examples of Hannifin Hydraulic Presses illustrate the simple, sturdy construction and the development of controls designed to make the most of the operator's skill by simplifying control operations and handling of work. They are delivering fast, easily handled production on press-fit assembly, forming, straightening, and similar operations.

Hannifin press construction, with welded frames, built-in hydraulic power units, and sensitive, accurate control, permits flexibility in design to meet individual needs. Table construction, gap, reach, and ram stroke are readily modified in Hannifin standard size presses to adapt the performance to your production needs. Ram stroke is adjustable to avoid unnecessary up-travel of ram.

Hannifin engineers will provide detailed recommendations, or press bulletins will be sent upon request.

HANNIFIN MANUFACTURING COMPANY 621-631 South Kolmar Avenue . Chicago

Detroit Representative: R. A. BEAN, Hayward Building 4829 Woodward Avenue • Telephone Columbia 4949



50-ton general purpose hydraulic press. Stroke 14 in., reach 10 in. Both manual and foot control. Adjustable maximum pressure. Adapted to a variety of production operations

75-ton standard 4 column hydraulic press, 36 inches between columns. Alternate hand or foot operated push-button control.



While National Defense needs are taking most of our greatly enlarged plant capacity, we will continue every possible assistance to users of Mannifin production tool equipment. Standard types of Hannifin hydraulic and pneumatic equipment may be modified to meet individual needs, avoiding delays due to special design. Hannifin engineers will give you specific recommendations.

HANNIFIN Hydraulic Presses

THE TOOL

TRADE MARK REGISTERED



ENGINEER

Volume X Number 10

Danger: Bursting Bubbles

A FREQUENTLY heard question today, voiced by those busy with Defense work is "Yes, but what will happen when the bubble bursts?"

Tool Engineers, in particular, have cause to fear the aftermath of this boom; they know from bitter experience that booms usually burst and that Tool Engineers are among those hardest hit in times when there is little production and virtually no plant expansion—which means no machines for them to buy, no production processes to plan, no plant layouts to prepare.

Because this is a Defense Boom there can be no holding back. We build plants, right and left, for immediate production with no thought of tomorrow, because we must have that production now. We have a tremendous advantage this time, however. In most booms in the past there was a feeling that the millenium had arrived and that the boom would last forever.

This time we have no illusions.

We know that our Defense Program will run at increasing intensity for several years. We know that we will probably not be naive enough to disarm after this war as we did following the first World War, but that in time the orgy of defense spending will end and we will awaken with the inevitable hangover: an apparent excess productive capacity and a staggering national debt.

In coming months more and more productive capacity will be directed to our defense efforts; we will shift our weight increasingly from the customary economic supports to the shaky cords that hang from this mythical bubble.

Those who glumly face the future, however, reckon without the ingenuity of the Tool Engineer. Few people are unseeing enough to believe that Americans as a whole were plentifully supplied with even necessities before the Defense Program was undertaken.

It cannot be said that the capacity which we are creating today will become excess capacity after the war; it will become, rather, misdirected capacity. It will then be the task of Tool Engineers, as it was their task to create it in the first place, to redirect this capacity along peaceful lines.

There is no cause for foolish optimism, however, any more than there is reason for undue pessimism. It will not be easy and it will not be done in a day. But the ingenuity of Tool Engineers, if given the opportunity, will salvage much and make new and improved processes for building new and improved products. They will counter rising labor costs as much as possible with increased efficiency, and while they will make no Utopia they can supply Americans with more of the necessities and luxuries of modern living than they have ever enjoyed before.

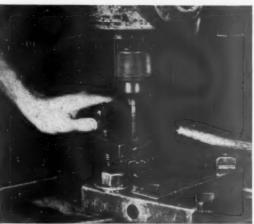
Make Your Taps LAST LONGER!

The right lubrication helps. It will give faster production, better size control and smoother threads, too. Here are a few tips.

First: Use plenty of lubricant. Put it where it will do the most good. Force it into the hole parallel with the axis of the tap if you can — use two streams on horizontal tapping. For deep tapping and finer pitches, use light or diluted oil to insure reaching the point of the tool. Be sure it's flowing when the tap starts to cut. This helps wash out the chips, too.

Second: Keep the lubricant clean. When it becomes dirty or gritty, replace it with new, clean lubricant.

Third: — and very important, different materials require different lubricants for most efficient tapping. Your oil company's lubrication engineer will give you specific advice, but here are some useful general hints.



This is one of a series of advertisements published by Greenfield Tap and Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

SUGGESTED TAPPING LUBRICANTS

Material Being Tapped Lubricant	Material Being Tappe				
Allegheny Metal Sulphur Base Oil Aluminum Kerosene & Lard Oil Bakelite Dry	Nickel Silver				
Brass	Cast Chromium Machinery Manganese Steel Molybdenum Nickel Stainless				
Iron—Cast. Dry or Compound —Malleahle Compound or Sulphur Base Oil Monel Metal Sulphur Base Oil or Kerosene & Lard Oil	Tool Tungsten Vanadium				

Materi	al Being Tapped	Lubricant
Nickel S	lver	Sulphur Base Oil or Kerosene & Lard Oil
Rubber	Hard	Dry
		. Sulphur Base Oil
FORM	Chromium	Sulphur Base Oil
Manganese.	Machinery	. Compound or Sulphur Base Oil or Kerosene & Paraffin
	Manganese	. Compound or Sulphur Base Oil or Kerosene & Paraffin
Steel	Molybdenum.	Sulphur Base Oil
Nickel	Nickel	Sulphur Base Oil
	. Sulphur Base Oil	
	Tool	Sulphur Base Oil or Kerosene & Lard Oil
1972年	Tungsten	. Sulphur Base Oil
		. Sulphur Base Oil

GREENFIELD TAP AND DIE CORPORATION GREENFIELD, MASSACHUSETTS.

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GTO GREENFIELD

Machining the Rolls-Royce Engine

In forty weeks Packard has built and set in operation a plant to build Rolls-Royce aircraft engines which represents a new peak in the application of automotive mass production methods to aircraft.

By J. A. ASHBURN

NOTHING is more interesting to the Tool Engineer than the task of planning and putting into operation a complete manufacturing plant, consisting of entirely new machines, tools, and equipment. Ordinarily an industrial plant experiences a gradual growth and expansions involve the alteration and use of existing facilities. The National Defense Program has, however, been responsible for the building of plants of enormous size starting from nothing.

One such case is the Rolls-Royce Engine Factory of the Packard Motor

Car Company. It has taken forty years to build up the facilities of this automobile company, yet in forty weeks they have created an industrial facility almost as large as the Packard Company itself, starting with only a contract, a bundle of blueprints and an experienced management.

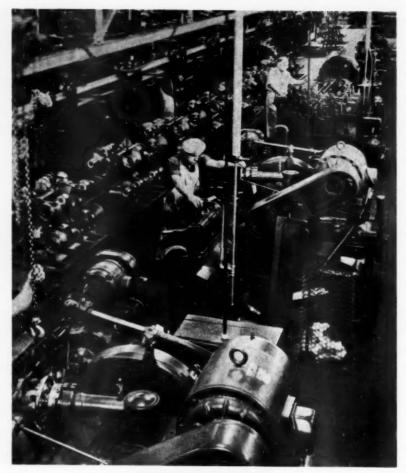
When the blueprints, some two thousand of them, were received in this country from Rolls-Royce, Ltd., they were taken by the engineering department and redrawn to conform with American standards and methods of manufacture. The initial order (6000 for Great Britain 3000 for the United States) was of sufficient size to permit a much greater introduction of mass manufacturing methods than had been used by the English firm and probably greater than has ever before been used in the aircraft industry.

Tooling Plans

The revised blueprints were turned over to the Process Department which prepared the operations sheets. Tooling was planned so as to utilize special machines and standard machines with



One of Three New Buildings for Rolls-Royce Manufacture
The conversion was almost as great.



Crankshaft Production Line
Learning a lesson from automotive mass production, a moving conveyor carries
crankshafts through the machining operations.

special tooling. In cases where special tooling was unnecessary, standard machines were ordered for particular operations. Universal machines were not employed as such. The operations sheets, including details of dimensions, tolerances, tools, and fixtures and with the machine for each operation specified, were approved by the Master Mechanic, and the Factory Superintendent. The machines were then ordered and the tooling ordered for standard (about 65% of the total) and special machines. Gages and inspection devices were also ordered.

Meantime the operations sheets were sent to the plant layout department which began layout of the plant along automotive lines. Parts progress from machine to machine along production lines and parts making up sub-assemblies are conveyed while in production, to the point of sub-assembly.

About 430,000 square feet of floor space in existing Packard buildings was cleared out and allotted to the Rolls-Royce project. In addition three new buildings with a total of about 550,000 square feet were erected. It has been estimated that to attain a production rate of 40 engines per day about 18,200 men would be required (14,750 machine men and 3,400 inspectors, stock and maintenance men).

Approximately 3,250 new machines ranging in price from \$700 to \$25,000 each were ordered for the plant. The average price per machine was approximately \$6000. A breakdown showing the approximate number of each type of machine is shown in Table I. There were 6,000 orders for patterns, each order containing one or more items. There were 25,000 orders for standard tools and miscellaneous equipment, and 34,000 special tool orders.

The engine itself is a V-type, twelve cylinder engine liquid-cooled, developing 1300 hp. Like all aircraft engines it must be produced with a very high degree of accuracy and all parts must be highly polished, or machined to a stated profilometer reading.

An indication of the methods employed in the machining of the many parts may best be gained by a detailed consideration of several individual parts.

Crankshaft

The crankshaft forging is purchased already heat treated, centered, and straightened. It is given a Brinell hardness test and then run through 85 different operations on 108 machines. One of the bearings is first spot ground on a Norton grinder to provide a steady rest. Two Wickes crankshaft lathes then rough cheek, turn, the main bearings and form fillets. In all these first operations 1/8" is left for finishing. Five of the bearings are ground for locating purposes on a Landis Grinder. To locate throws, a hole is drilled and reamed thru one of the pins by a Baker horizontal drill press. All pin bearings are rough cheeked, turned, and fillet formed on a Melling pin turning lathe. Two Kearney and Trecker mills are used for rough milling counterweights. The counterweight contours are turned on a Melling contour turning lathe.

TA	B	LE	ı				
Precision Boring						 ٠	48
Chucking					× 1		90
Drills							
Centerless Grinde	DES						60
Gear Grinders .							
Thread Grinders							60
Gear Cutter & SI							
Lathes							440
Milling Machines							
Polishing Machin							
Profilers							
Automatic Screw							
Hand Screw Ma							
Tapping Machine							
nspector Machin							
Various Others .							
							_
Total Machines			į.				3250

The ends are recentered on a Sundstrand and the bearings relocated by grinding on a Landis. Holes thru pins and main bearings are successively drilled on two W. F. & John Barnes horizontal drills. The ends are rough bored on a Barnes Double End boring machine.

Following these preliminary machining operations the crankshaft is



Cleaning Aluminum Castings Emery, wire wheels, and rotary files work under powerful suction.

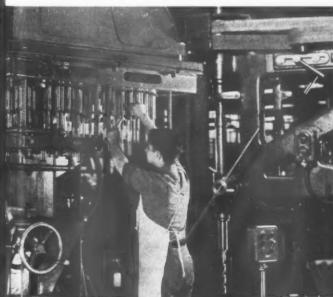


Cylinder Liner Machine Shop Many machines have been added since this picture was taken.

heat treated to relieve stresses by holding at a temperature of 1100° F for five hours. It is then semi-finish and finish machined in a similar series of operations which leave .010 to .035 for finish grinding. After a second heat treating operation to relieve stresses, the crankshaft is again recentered and then run through a series of

grinding operations on bearings and cheeks. Bearing holes are finish bored and honed. Oil holes are drilled. Areas which cannot be machine finished are emery dressed and polished. Splines are shaped on a Fellows gear shaper. The crankshaft is balanced, polished, magnafluxed, and nitride hardened for 84 hours.

Profilometer readings for finished bearing surfaces must be held within four micro inches but actually are held within $1\frac{1}{2}$ to two micro inches. Permissible taper is .0002 in the length of the bearing. The crankshaft is held within 34 ounce inch in dynamic balance by the use of a Gis-



Natco Multi-Drill for Supercharger Case Hammond Radial Drill in foreground is also used in same part.



Supercharger Case Production Line Skilled workers perform turning, boring, drilling and reaming operations.

OPERATIONS SHEET

Steel Forging SPOT GRIND No. 3 Main Bearing for steady rest.

ROUGH CHEEK, TURN, and FILLET No. 1-4-7 Main Bearin STRADDLE FACE flange, TURN OD of flange, FORM ANGLE on inside of flange.

Automatic center drive Wickes crankshaft lathe.

ROUGH CHEEK, TURN, and FILLET No. 2-3-5-6 Main Bearings. Automatic type Wickes crankshaft lathe

GRIND No. 1-3-4-5-7 Main Bearings for locating purposes. Landis arinder.

DRILL and REAM hole thru No. 6 pin for locating throws. Single end Baker horizontal drill press. ROUGH CHEEK, TURN, and FILLET all pin bearings.

Melling pin turning lathe.

ROUGH MILL radius and flat portion of counterweights on both

Special vertical sliding head Kearney & Trecker.

REMOVE STOCK on both sides of counterweights to provide clear-

Kearney & Trecker Milwaukee milling machine ROUGH TURN cheek contours of B counterweight; TURN part of contours and outside radius on A-C-D counterweights.

Melling contour turning lathe.

RECENTER both ends. Sundstrand double end centering machine.

GRIND all main bearings for locating purposes. Landis grinder. DRILL holes thru pins.

W. F. & John Barnes horizontal single end drill. DRILL thru main bearings.
W. F. & John Barnes horizontal drill.

ROUGH FACE end; ROUGH BORE ends. Barnes double end boring machine.

WASH. INSPECT. HEAT TREAT.

RECENTER.

W. F. & John Barnes double end centering machine.

W. F. & John Barnes double end centering purposes. SPOT GRIND No. 3 main bearing for locating purposes.

Norton grinder.

SEMI-FINISH CHEEK, TURN, and FILLET No. 1-4-7 main bearings: STRADDLE FACE flange, TURN OD of flange, FORM angle on inside face of flange.

Automatic center drive Wickes crankshaft lathe.

SEMI-FINISH CHEEK, TURN, and FILLET No. 2-3-5-6 main bear-

ings. Wickes crankshaft lathe duplex type.

GRIND No. 1-3-4-5-7 main bearings for locating purposes. Landis grinder.

SEMI-FINISH CHEEK, TURN, and FILLET all pins. Melling pin turning lathe

ROUGH TURN angle on all cheeks and counterweights. Wickes crankshaft lathe duplex type.

INSPECT.

SPOT GRIND No. 3 main bearing for steady rest. Norton grinder.

FINISH CHEEK, TURN, and FILLET No. 1-4-7 main bearings; STRADDLE FACE flange; TURN OD of flange; FORM ANGLE on inside face of flange.

Wickes automatic center drive crankshaft lathe. FINISH CHEEK, TURN, and FILLET No. 2-3-5-6 main bearings.

Wickes crankshaft lathe duplex type. GRIND all main bearings for locating and steady resting. Landis arinder.

FINISH CHEEK, TURN, and FILLET all pins. Melling pin turning lathe.

ROUGH BORE holes thru 6 main bearings. ROUGH BORE pin holes. SEMI-FINISH bore holes thru 6 main bearings. SEMI-

FINISH pin holes.

W. F. & John Barnes horizontal single end boring machine. FINISH FORM MILL radius and flat portion on both sides of counterweights.

Special Kearney & Trecker vertical mill.

FINISH FORM MILL radii on counterweights. Kearney & Trecker plain milling machine

FINISH TURN cheek contours on B counterweight; turn part of contours and outside radius of A-C-D counterweights. Melling contour turning lathe.

FINISH TURN angle on all counterweights and main bearing cheeks.

Wickes automatic duplex crakshaft lathe.

INSPECT. STRESS RELIEVE. INSPECT.

RECENTER both ends. Hall eccentric grinder.

GRIND faces and radii of main bearing cheeks. Landis grinder.

SEMI-FINISH GRIND main bearings. Norton cylinder crankshaft bearing grinder.

GRIND faces of pin cheeks and radius of pin bearings. Landis grinder.

SEMI-FINISH GRIND pin bearings. Norton pin grinder.

FINISH BORE holes thru main bearings; FINISH BORE holes thru

W. F. & John Barnes horizontal boring machine.

holt crankshaft balancer. It is carried through the entire sequence of operations without the necessity of straightening at any time after the forging is received. A more detailed analysis of these operations will be found in the Operations Sheet.

One of the most difficult parts to machine is the upper crankcase which uses 77 machines in 138 operations. Multiple equipment is employed to good advantage here for there are 350 holes to drill and ream.

A Cincinnati Hydro-Tel milling machine is used to rough mill bottom of motor mounts and sides and bottom of bearing cap spaces for locating. The lower joint face is milled on a Newton vertical mill and then a number of surfaces are rough milled on a series of Cincinnati millers. Eight holes in

motor mounts are drilled on an American radial drill. Another series of milling operations is followed by a group of multiple bores performed on a special W. F. & John Barnes Horizontal Double Head machine. This machine performs a sequence of eight operations on the Upper Bearing Reduction Gear End; four operations on the Lower Bearing Reduction Gear End; five operations on the Front End Generator Housing; two on the Wheelcase End Generator Housing; and three on the idler hole. These operations include boring, facing, chamfering, and backfacing. This machine provides an excellent example of a machine designed to do only a particular job.

A Van Norman vertical mill is used to profile end mill the eye bolt boss.

Other bosses are milled on a Krueger special machine and a Snyder 2-Way miller. The 56 stud holes are drilled and reamed on two Baush Multi-Drills. The Crankcase is mounted in the first machine and 28 holes are drilled in one side. The crankcase fixture is indexed and 28 holes are drilled in the other side. The crankcase is moved to the second machine where the holes are reamed in similar fashion.

Three more Baush Multi-Drills are used to drill, counterbore, and ream 14 main bearing stud holes and drill 14 cross bolt holes in each side. Four angular holes are drilled, counterdrilled, counterbored, spotfaced, and tapped on a Carlton radial drill. With a hand electric drill 17 vent holes are added.

FOR CRANKSHAFT

ROUGH and FINISH COUNTERSINK all main bearings and pin bearings.
W. F. & John Barnes horizontal boring machine.

DRILL 6 angular oil holes in 2-3-5-6 main bearings. Leland Gifford universal oil hole drilling machine.

DRILL 6 straight oil holes in pins and 11 straight oil holes in 2-3-4-

5-6-7 main bearings.
Leland Gifford universal oil hole drilling machine.

FORM RADIUS and POLISH on angle oil holes and oil cap holes inside of pin and main bearings.

GRIND angle in oil seats in main and pin bearings. Hall grinder special.

FINISH HONE main bearing holes.

Barnes special single spindle reciprocated honing machine.

FINISH HONE pin holes.

Barnes special single spindle reciprocated honing machine.

WASH.

GRIND contour cheeks.

Special Lands contour grinder.

GRIND chamfer on B cheeks. Landis grinder.

GRIND angle on cheeks and counterweights.

Landis grinder.

FORM chamfer around edge of cheeks and counterweights.
Schraner burring machine. FILE radius at the chamfer around edges of cheeks and counter-

weights.
Schraner burring machine.

EMERY DRESS and POLISH chamfer around edge of cheeks and counterweights of portion of contour not finished on contour grinder. HAND FINISH and POLISH radius at corners of all counterweights and POLISH angle and both sides of all cheeks and angle on cheeks marked B. FILE radius on both sides of chamfer around edge of contour and radius at counterbore in pin bearing holes.

Ingersoll Rand drill.

INSPECT.

FINISH GRIND main bearings.

SEMI-FINISH GRIND flange OD and outside face of flange. Landis grinder.

ROUGH BLEND angular face at back of flange. Landis grinder.

SEMI-FINISH BORE flange end. FORM angle and CHAMFER

Cross Sliding International heavy duty Libby turnet lathe. FINISH FACE end; SEMI-FINISH bores; SEMI-FINISH counter-

Cross sliding International heavy duty Libby turnet lathe.

MILL large diameter, SEMI-FINISH smaller diameters. FINISH COUNTERBORE; FACE length.

Hall planetary mill.

FINISH GRIND pins.

Norton grinder.
ROUGH and FINISH SHAPE splines.

Fellows horizontal gear shaper.

FORM radius and POLISH all angle oil holes and oil cap holes outside of all pin and main bearings.

FINISH GRIND width of pin bearings and radii.

Norton grinder.
FINISH GRIND width of No. 4 main bearing and radius.

Landis grinder.

BALANCE. Gisholt crankshaft balancing machine.

REMOVE stock for balance.

Landis grinder.

REBALANCE.

Gisholt crankshaft balancing machine.

REMOYE sharp adges left while grinding for balance.

GRIND diameter in No. 1 bearing.

Lodge and Shipley lathe with Ex-Cell-O internal grinding attachment.

POLISH radius, angle, and bottom at flange end. Blount 3-step head speed lathe.

POLISH pin bearings and CORRECT bearing diameters.

LeBland lathe.

POLISH main bearings and correct bearing diameters. American lathe. Sidney lathe.

WASH.

MAGNAFLUX. DEMAGNETIZE.

WASH and BLOW OFF.

INSPECT. NICKELPLATE outside portion of flange.

INSPECT.

NITRATE HARDEN.

INSPECT-Rockwell.

LAP centers

FINISH GRIND outside face of flange, OD of flange, and chamfer

on OD of flange

Landis grinder.
FINISH BLEND angular face at back of flange.

Landis grinder.

DRILL and ROUGH REAM all holes in flange.

Baush vertical 24-spindle drill.

COUNTERSINK all flange holes on inside face of flange.

Single spindle Leland Gifford drill press.

INSPECT.

A Baush Multi-Drill combination drills and counterbores 61 holes in the lower joint face. A Natco 3-Way tapper then taps 45 holes in the lower joint face. A number of holes (19 in one section, 22 in another, 4 in a third, 14 main bearing stud holes, 4 generator pad holes, and 7 relief pad holes) are hand tapped. The remaining 16 holes in the lower joint face are rough tapped on a Natco 1-Way multi-tapper. A Natco angular hole tapper takes care of 14 holes in each side of the cylinder joint face. The other 14 are hand tapped. Finish drilling of the remaining holes is performed on a Carlton radial drill and a Krueger 6-Spindle drill.

Machining Piston

A much simpler part, but one re-

quiring the utmost precision is the piston. The piston is rough formed from an aluminum forging in two Sundstrand chucking lathes. The first rough turns the outside, faces the end, forms radius in crown, and chamfers the top. The second rough bores the inside diameters. A Natco 2-Way drill press is then used to drill and ream the wrist pin hole. The piston then goes through another series of chucking lathes. The first semi-finish bores and faces to length while the second semi-finish turns the outside diameter, rough cuts the ring grooves and shedder grooves.

Inside faces of the wrist pin bosses are milled on a Kearney and Trecker Vertical 2-Spindle milling machine. A Snyder profile mill mills the inside relief on the piston. The recesses under the wrist pin bosses, and relief sections are milled on two Kearney & Trecker machines.

The skirt is finished bored in a fifth Sundstrand chucking lathe and the diameters are finished turned in a Seneca Falls Lo Swing Imp lathe. Retainer ring pin holes are drilled in an Allen drill press. The oil drain holes are drilled in Krueger drill presses.

Ex-Cell-O boring machines are used to semi-finish the wrist pin hole and cut retainer ring grooves. The radius on the inside of the piston pin boss is formed by a Leland and Gifford single spindle drill press. Retainer removal ring holes and relief slots are milled on a Kent Owens hand mill.

The piston is polished on Gardner polishing lathes and then refinish



Machining Bearing Blocks for Forked Connecting Rod Each is protected from damage in a separate container.

turned and bored on Ex-Cell-O precision turning and Diamond boring machines. A Morris Piston Balancing Machine is used to bore the skirt to the proper weight. Operations on the piston are completed by removing all burrs and sharp edges.

The gear used on the main drive of the supercharger is more or less typical of the many gears used in the engine. In machining this gear it is first chucked on the outside diameter in a Potter & Johnston 2-Spindle chucking machine. In this position the machine drills hole thru, rough turns the outside gear diameter part way, rough turns the hub, rough counterbores the diameter, rough faces gear, web, and hub, and semi-finish faces the gear side.

The gear is then chucked on the inside diameter of the counterbore in another similar machine which rough finish turns the gear diameter, rough counterbores, rough faces gear face

and web, finish bores and reams hole, semi-finishes gear tooth side and finish straddle faces gear tooth sides and forms both sides of gear diameter.

The outside diameter is ground in a Norton grinder. The gear is located on arbor and back face of teeth and the teeth are hobbed in a Cleveland gear hobber. After carburizing, the gear is semi-finished and finish turned in two chucking positions on two Potter & Johnston automatic chucking machines. All underground surfaces are then polished on a Schauer speed lathe.

The spline hole is ground in a Bryant hole and face grinder. The serrations are cut on a Fellows gear shaper. A Kent Owens hydraulic milling machine is used to mill the keyway on centerline of offset hole. A Cincinnati Bickford drill press is used to drill and counterbore eight holes thru the gear, a Bryant internal grinder is used to grind thread diameter and a Nor-

ton external cylinder grinder grinds the outside diameter of the gear.

The teeth are ground in a Pratt & Whitney gear grinder and the thread is ground in a Jones & Lamson thread grinder. A special nut arbor is used to hold the gear in this thread grinder. The same arbor is used when holding the gear in the Norton external cylinder grinder to grind the outside diameter.

The gear is magnafluxed for checks or cracks.

Connecting Rods

Connecting Rods are of the fork and blade type, for V-Engine use, and a consideration of the machining of the blade end, blade cap, and the assembly of these two parts will not only be indicative of the methods used throughout the production of the connecting rod assembly, but, in a more general sense, will show the precision and care which is involved in all assemblies in the engine.

The bolt bosses on the blade are milled on two Cincinnati mills, drilled and reamed on a Natco vertical drill press. The crankpin hole is bored on another Natco. Webs, channel, and faces are milled in a series of operations running through ten machines (7 Cincinnati's, a Kearney & Trecker, Kent Owens, and Natco Drill Press tooled for hollow milling).

After heat treating, crank and wrist pin bosses are ground on a Blanchard grinder. Bolt bosses are ground on an Abrasive surface grinder. A Natco vertical drill press is used to finish bore, under cut, and ream the pinhole.

The blade and cap, which were until now one forging, are sawed apart on a Cincinnati plain automatic mill. The two pieces are finished separately and then assembled.

The blade end is then carried through a series of finish milling operations, a Keller machine being used to mill ribs and radius at bottom of ribs. The joint faces are ground on a Mattison Precision surface grinder and the entire blade rod is polished on a Gardner polishing lathe.

This polishing operation as well as other such operations which have been mentioned are all performed in the polishing department. All rough and precision polishing is done in this department, 92 Gardner polishing lathes being employed for the purpose. These lathes are equipped with individual air exhaust systems.

The cap for the blade end of the

connecting rod, after sawing from the blade is finish milled in a series of operations, the joint faces are ground, and the radius on the bolt boss is form milled by a Snyder 3-Spindle milling machine. The cap is polished as was the blade.

Assembly of Blade and Cap

The joint faces of blade and cap are lightly lapped and assembled with temporary bolts. The crank and wrist pin bosses are finish ground on both sides on a Blanchard surface grinder. The crankpin hole is finish bored. A Barnes drill press is used to rough counterbore the shell bearing seats. The bolt bosses are polished and the blade and cap are disassembled.

The joint faces of the rod and cap are lapped. The small bore is ground and polished on a Heald Gagematic. The bolt holes in rod and cap are precision reamed. The two parts are magnafluxed and assembled with slave bolts.

One slave bolt is removed from the assembly and the hole is honed on a Sunnen honing machine. The part is washed and assembled with the final bolt in honed hole. The operation is repeated on the other bolt.

The large bore of the now-assembled blade and cap is ground on a Bryant 2-Spindle grinder. A series of honing and lapping operations

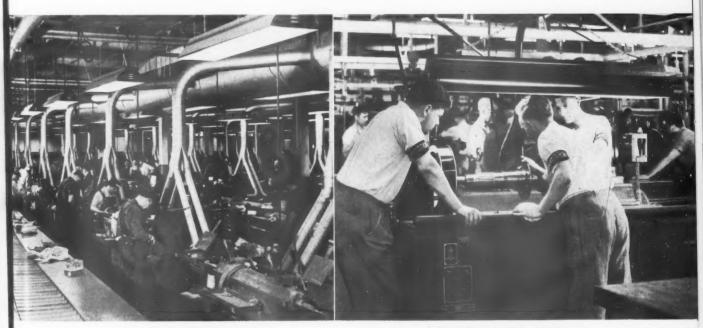


Pisten Machining Department
Precision machines work to a ten-thousandth of an inch.

complete production of the part.

One other part that offers interesting features is the Wheelcase. This

piece is a casting and is rough faced and turned on a Bullard vertical turret lathe. After several milling, facing



Buffing and Polishing Department
Steel and aluminum finished in microinches.

Magnafluxing Propeller Shaft Even minutest checks or cracks are taboo.

OPERATIONS SHEET FOR CONNECTING ROD BLADE

Receive Forging

MILL boss faces. Large and small end both sides. Cincinnati 2 spindle vertical hydraulic mill.

MILL slides of bolt bosses. Cincinnati plain automatic mill.

DRILL & REAM small boss. Natco drill press No. 3.

ROUGH BORE crankpin hole. Natco vertical drill press. ROUGH MILL edges of web.

Cincinnati plain hydraulic milling machine.

ROUGH MILL radius at lower end of rod and flat for bolt head. Cincinnati plain hydramatic mill.

ROUGH outside faces of webs.

Cincinnati plain hydraulic millers with tracer control.

ROUGH MILL inside face of channel. Cincinnati plain hydraulic millers with tracer control.

ROUGH MILL channel (both ends).
No. 2 K. M. Kearney & Trecker ROUGH MILL form at cap end. Cincinnati plain hydraulic millers.

ROUGH MILL between ribs at cap end. Kent-Owens

HOLLOW MILL wrist pin boss. Natco drill press.

ROUGH MILL radius at lower end of rod and flat for bolt head. Cincinnati plain hydramatic mill.

REMOVE BURRS. WASH & BLOW OUT. INSPECT HEAT TREAT.

ROUGH GRIND crank & wrist pin bosses, both sides.

Blanchard grinder.

ELECTRIC ETCH serial number. SEMI-FINISH GRIND bolt bosses to width.

Abrasive surface grinder.
FINISH BORE, UNDER CUT, & REAM pinhole.

Natco vertical drill press. SAW OFF cap.

Cincinnati plain automatic mill. FINISH GRIND bolt bosses.

Abrasive surface grinder.
FINISH MILL joint face & radius on crank pin and of rod

Cincinnati plain hydraulic mill.

FINISH MILL edges of web.

Cincinnati plain hydraulic mill.

FINISH MILL outside faces of web. Cincinnati plain hydraulic mill with tracer control.

PROFILE MILL web contour. Cincinnati Hydro-Tel.

FINISH MILL channel.

Cincinnati plain hydraulic mill with tracer control.

FINISH MILL channels, both ends, both sides.

No. 2 Kearney & Trecker.

FINISH MILL ribs & radius at bottom of ribs. Keller type BL-2416.

MILL PROFILE top of crankpin bore. Kent-Owens hydraulic machine.

GRIND joint faces.

Mattison precision surface grinder. FINISH HOLLOW MILL around wrist pin boss. Natco drill press

DRILL & SEMI-FINISH REAM bolt holes. Natco drill press

COUNTER BORE, REAM, & COUNTERSINK bolt holes, wrist pin end.

Natco drill press. MILL radius on bolt bosses. Cincinnati plain automatic miller.

MILL relief on bolt boss. Kent-Owens hand mill.

MILL slot for bolt head. Kent-Owens hand mill.

DRILL angular holes in wrist pin boss.
No. 2 LMS 14" LYG drill press single spindle.

REMOVE BURRS. WASH & BLOW OFF. POLISH COMPLETE to include undercut in pin bore. Gardner polishing lathe.

FINISH FORM MILL outside radius on bottom of cap & finish mill joint surface

Cincinnati plain hydraulic mill. FINISH MILL contour between ribs. Kent-Owens hydraulic mill.

GRIND joint face. Mattison grinder.
FINISH GRIND bolt bosses.

Abrasive surface grinder.

DRILL & REAM 2 bolt holes.

Natco drill press. SPOT FACE bolt holes & COUNTER REAM holes.

Natco drill press. FORM MILL radius on bolt boss.

Snyder 3 spindle milling machine.

REMOVE BURRS.

WASH & BLOW OFF. INSPECT.

POLISH COMPLETE. Gardner polishing lathe.

INSPECT. LIGHTLY LAP joint faces of rod & cap.

Gardner rotary lapper.

ACID STAMP piece & serial number in rod channel cap & rod assembly with temporary bolts.

FINISH GRIND crank & wrist pin bosses, both sides,

Blanchard surface grinder.
FINISH BORE crank pin hole.

Natco drill.

ROUGH COUNTER BORE bearing seats. Hydramatic Barnes drill press.

MILL radius at joint section on bolt boss

Kent-Owens hand mill. INSPECT.

POLISH bolt bosses. Gardner polishing lathe INSPECT.

DISASSEMBLE. MILL bearing lock slots rod & cap Kent-Owens mill.

LAP joint face on rod. GRIND small bore & polish Heald gagematic.

LAP joint face on cap.

PRECISION REAM bolt holes in rod & cap & COUNTER REAM on wrist pin end & COUNTER REAM cap.

Natco precision reaming machine. BURR.

WASH. MAGNAFLUX.
ASSEMBLE rod & cap with slave bolts.

REMOVE one slave bolt from rod assembly. Place assembly in boring machine & bore hole. Remove from machine. Wash thoroughly and blow off. Assemble final bolt in bored hole. Repeat operation on other bolt.

Sunnen honing machine.

GRIND large bore, COUNTER BORE, & FACE both sides. Bryant 2 spindle grinder.

HONE crank pin bore. Barnes hone GRIND CHAMFER one side.

72-A Heald.
GRIND CHAMFER other side. 72-A Heald.

TAP large bore. Ideal speed lathe HONE crank pin bore. Barnes honing machine.

STONE all sharp edges. ETCH pairing number. WASH & BLOW OFF.

BALANCE RODS. TOUCH UP.

Gardner polishing lathe. WASH & BLOW OFF. INSPECT.



Final Check
Test engineers give the
Packard Rolls-Royce engine its final check and
adjustment before the

and drilling operations, the part is placed in an 11 Spindle W. F. and John Barnes machine. This machine rough bores five diameters in each of the two angular cam drive shaft holes and forms radius in bottom; rough bores central hole between the two angular holes just drilled; rough bores starter extension bearing hole: rough bores one magneto hole, rough bores and chamfers starter hole; rough bores and chamfers Inertia starter hole; rough bores fluid pump hole and three bearings in line and chamfers them; rough bores, counterbores, chamfers, and spotfaces supercharger pump hole; rough bores and chamfers oil pump hole; rough bores two diameters in one magneto hole and one diameter in back of opposite magneto bore and chamfers it.

When this remarkable machine has finished these operations the wheelcase is run through a series of finish milling operations. A Heald 2-Way line bore, Hammond radial drills, Baush and Natco Multi-Drills are used for the many holes. Taft Peirce Spotfacers are used on many of the holes for spotfacing. A second W. F. & John Barnes machine is used to finish the operations roughed on the first machine.

Engine Assembly

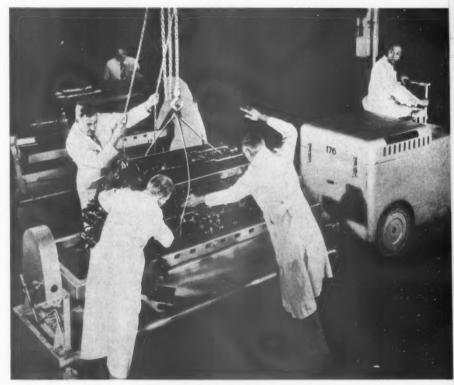
These parts indicate the multiple operations involved in the production of these precision built parts. Most parts are given rough, semi-finish, and

finish machining operations frequently with heat treats between the sequences.

The engine is assembled from the completed parts and given an eight hour test run. It is then completely torn down, the parts inspected for signs of failure, and the engine is reassembled. It is interesting to note that when running at rated horsepower ready for take off an engine consumes gasoline about as fast as a man could empty full buckets that one handed to him. At this rate on the eight hour test run one engine consumes 960 gallons of gas,

There are twenty-six test cells and all of them running on full test, three shifts a day, would consume about seven tank cars of gasoline a day. Each engine also uses approximately four tons of air per hour to mix with the gasoline.

More remarkable than these facts, however, are the methods of manufacture which are employed in the production of this engine. For years it has been axiomatic that the high precision required in aircraft engine design precluded the possibility of adaptability to the methods of mass manufacture. It remained for the National Defense Program to create the necessity, for Packard to redesign the engine, and for their Tool Engineers to devise processes of production which retained the precision and included the relative speed and economy of the production line.



Completed Rolls-Royce Engine Faces testing, tear down, minute examination, reassembly.



J. L. Raiston, Canadian Minister of National Defense, peers through the sight of a Bren gun

A. S. T. E. First International Meeting Studies Conversion to War Material

IN these stirring times, the very na-ture of this International Conference for Tool Engineers makes it the most important meeting yet called for these key men of industry and defense. Not a single Tool Engineer can afford to miss this great occasion, and from reports both in Canada and the United States there are already many who plan to attend. Most of these men have heard of the royal welcome waiting for them in Toronto, October 16th, 17th and 18th. They are planning to attend the several Technical Sessions, which are of such primary importance to them because of the nature of the subjects to be discussed, and they know about the many excellent plant tours of Canadian armament industries that have been arranged for them-by special dispensation from the Canadian government.

Many topics of vital interest to Tool Engineers are to be discussed in

To be sure of accommodations for the Semi-Annual Meeting of A.S.T.E., October 17, 18, 19, notify L. G. Singer, 11 Front St., Toronto, Ont., not later than October 9, 1941.

the three technical sessions scheduled for Thursday evening, October 16th, Friday afternoon, October 17th and Saturday morning, October 18th. On Thursday evening "Machine Tools for National Defense Production" will be discussed by two speakers.

Arnold Thompson, Consulting Tool Engineer of Toronto, will present a paper on the subject-"Adapting Old Tools for Precision Production in an Emergency." Fred C. Dull, Vice-President of the Monarch Machine Tool Company, of Sidney, Ohio will discuss - "Modern New Machine Tool Advantages". On Friday afternoon another technical session will be held covering the important topic of "Getting the Most Out of Cutting Tools". Three speakers will cover different phases of this topic, as follows: "How to Get the Most Out of Cutting Tools" by Roy T. Wise, Deputy Machine Tools Controller, Department of Munitions and Supplies, Canada. "Carbide Cutting Tools" by Philip M. McKenna, President Mc-Kenna Metals, Latrobe, Pennsylvania.

(Continued on page 60)

PROGRAM

THEME - The Tool Engineer Turns to "War Production"

THURSDAY, OCTOBER 16, 1941

Registration—8:30 a.m. at Royal York Hotel—A.S.T.E. Headquarters.

Plant Tours Begin—9:45 a.m. Buses leave Royal York Hotel. Technical Session—Evening at Royal York Hotel.

Subject: "Machine Tools for National Defense

Production" Two Speakers

Arnold Thompson, Consulting Tool Engineer, Toronto, will discuss:

"Adapting Old Tools for Precision Production in An Emergency"

Fred Dull, Vice-President, Monarch Machine Tool Company, Sidney, Ohio.

"Advantages of Modern New Machine Tools"

FRIDAY, OCTOBER 17, 1941

Plant Tours Begin—9:45 a.m. Buses leave Royal York Hotel. Technical Session—Afternoon at Royal York Hotel.

Subject: "Getting the Most Out of Cutting Tools"
Three Speakers

Roy T. Wise, Deputy Machine Tool Controller, Department of Munitions and Supplies, Canada, will discuss

"How to Get the Most Out of Cutting Tools"

Philip M. McKenna, President, McKenna Metals, Inc., Latrobe, Pa.

"Carbide Cutting Tools"

Walter Esau, E. F. Houghton Company, Philadelphia, Pa.
"Proper Use of Cutting Oils"

SEMI-ANNUAL DINNER

6:30 p.m.—Concert Hall—Royal York Hotel

Principal Speaker: Honorable C. D. Howe, Director Department of Munitions and Supplies, Canada.

Introduction by Alexander Gray, President, Gray Forgings & Stampings Ltd., Toronto.

SATURDAY, OCTOBER 18, 1941

Technical Session-10:00 a.m. at Royal York Hotel.

Subject: "Training Personnel" Two Speakers

Roy M. Sherk, Director, War Emergency Classes, Western Technical and Commercial School, Toronto, will discuss

"The School's Task"

Edward Kennard, Plant Manager, St. Catharines Steel Works, St. Catharines, Ont.

"Industry's Task"

Times given above are Toronto Time—Eastern Daylight Saving Time

PLANT TOURS

War time restrictions make it impossible to name here the host companies, but by their cooperation and the special permission of the Canadian Government, twelve of the foremost munitions and armament plants of the Toronto district will be visited. No cameras will be permitted within the plants, visitors must submit their names in advance—by October 9—to be sure of accommodation on these trips.

TRIP No. 1

PLANT A World's largest machine gun plant manufacturing Bren light machine gun and Browning automatic rapid firing guns from alloy steel bar stock and forgings to finished product

to finished product.

PLANT B A shell case drawing plant manufacturing 3.5, 3.7 and 4.5 shell cases. From brass slug state through all drawing and annealing operations, trimming, threading, etc. Note this plant using 100% Canadian machine tools, hydraulic presses, trimming lathes, etc.

lathes, etc.

PLANT C A fuse or detonator cap plant manufacturing 40 MM fuses and bomb pistols complete. An interesting example of precision mass production on multiple spindle automatic screw machines, plus assembly and gauging problems of small intricate parts.

TRIP No. 2

PLANT D A plant manufacturing complete

from raw materials the standard British Lee Enfield 303 calibre Army Service Rifle and Bayonet. As gun manufacture is approximately 80% milling, this plant features mass production milling to close limits. PLANT E An aircraft plant manufacturing

PLANT E An aircraft plant manufacturing complete, except for engines and propellers, single engine two-seater training planes, and twin motor Avro Anson medium bomber training planes.

TRIP No. 3

PLANT F The largest High Explosive Shell Plant in Canada manufacturing from billet steel right through all hot forging, piercing, complete machining, waving, copper banding to finishing to a point ready for filling 3.5, 3.7 and 4.5 HE shells.

PLANT G A plant making the 3.7 Anti Air-

PLANT G A plant making the 3.7 Anti Aircraft Gun Barrel complete. A heavy machining plant turning, boring and rifling large gun barrels on giant lathes and grinders.

TRIP No. 4

PLANT H A plant manufacturing the Bofors 40 MM anti-aircraft gun complete, interesting points, precision machining of breech blocks, barrels, and firing and recoil mechanism.

PLANT I Canada's largest machine tool plant actively engaged in manufacture of long gun turning and boring lathes, also gun barrel rifling machines.

TRIP No. 5

PLANT J A plant engaged in manufacture of fire control apparatus, range finders, gun sights, etc., precision instrument work including lens manufacture from casting of optical glass and all lens grinding and polishing operations.

PLANT K A peacetime bicycle plant, swung

PLANT K A peacetime bicycle plant, swung over to manufacture of machine gun tripods, mountings, tube and stamping work.

pods, mountings, tube and stamping work.

PLANT L An interesting small plant engaged in manufacture of drawn 40 MM Shell Cases.

Arrangements have been made to hold all these plant tours two days, Thursday, October 16, and Friday, October 17. It will thus be possible for any member to take in any two of the five trips on the schedule selecting whichever is of most interest to him.



Frank W. Curtis, President of the American Society of Tool Engineers. Graduate of Missouri University. Has had wide experience in Tool Engineering was with Ford Motor Company in 1913; chief engineer with Dowd Engrg. in 1920; sales engineer with Haynes Stel-

lite in 1924; research engineer, Kearney & Trecker to 1935. At present is chief engineer, Van Norman Machine Tool Co. Author of many articles in the technical press and of three books on Tool Engineering. Resides in Springfield, Massachusetts.

A.S.T.E. Board of Directors 1941-1942

These are the new Directors of the Board of the American Society of Tool Engineers. By general ballot, these men were elected to represent The Society in all official matters and their individual regions as indicated. They are the governing body of The Society. They are the first Board to be so elected, by virtue of a change in the Constitution whereby chapters are combined into regional districts—each district, rather than each chapter, being represented by a member of this Board.



A. H. d'ARCAMBAL, Past-President, born in Kalamazoo, Mich. Graduate University of Michigan, 1912 as Bachelor Chemical Engineering. Six years as chemist and metallurgist in Detroit with automobile companies. Chief metallurgist Wright Aeronautical Corp. 1918-1919. At present consulting metallurgist and sales manager, Pratt & Whitney Div., Niles-Bement-Pond. Resides in Hartford.

C. O. HERSAM, Past Secretary, born in Lancaster County, Penna. Graduated Mechanical Engineer, L'Ecole Technique, Paris, France. Tool designer, Budd Wheel, tool designer, Studebaker Corp., tool designer International Motor Co., tool designer Budd Mfg. Co. For 21 years owner of business—C. O. Hersam, Consulting Tool Engineer. Resides in Philadelphia.





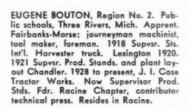
E. W. DICKETT, Past First-Vice-President. Born Albany, N. Y. Educated in Burlington Jr. College and the Univ. of lowa. Apprenticed at Watervliet Arsenal 1914-16. Sgt. U. S. Army 1916-1918. Tool maker, tool designer Watervliet Arsenal 1918-1920. 1928 to date with Sundstrand Machine Tool Co., Rockford, Illinois. At present proposal engineer. Resides in Rockford, Illinois.

D. T. FLATER, Region No. 1. Grad. H. S. 1915 Waterloo, Ia. Joined John Deere as clerk and inspector. 1917 U. S. Army. 13 years, continued education and worked as machinist, tool and die maker, foreman, Tool Engineer, master mechanic and finally planning and in charge of construction John Deere Wheel. 1934 wks. mgr. Chrysler Div. Now gen. staff master mechanic, Chrysler. Resides in Detroit.





E. A. RUTZEN, Past 2nd Vice-President. Born Milwaukee, Wis. Milwaukee Vocational High School and Milwaukee Vocational School. Nine years as supervisor and time study engineer with Cutler-Hammer. 1924 with Waukesha Motor Co., on time study and methods. 1930 as factory manager of the Wehr Co. At present asst. works manager, Evinrude Motors. Resides in Milwaukee.





F. R. CRONE, Past and present Treasurer. Charter member A. S. T. E. Prior to last World War, tool designer with such companies as Doble steam car, Saxon car, Studebaker, Cadillac and Maxwell. During war served overseas, stationed in Paris in air force making installation drawings of bombing devices, etc. Since 1920 with Lincoln Motor, now chief tool designer. Resides in Detroit.

C. V. BRINER, Region No. 3. Born in Shelby, O. Schooling at Shelby H. S., Ohio State Univ. Served apprenticeship at Ohio Seamless Tubing. Worked at Brightman Mfg. Co. Pierce-Arrow for 4½ years in production dept. Served in Army. Joined Pratt & Whitney Co. in 1921 at Cleveland, O. At present is branch manager for Pratt & Whitney. Resides in Cleveland.



58

THE TOOL ENGINEER



J. E. GILCHRIST, Region No. 4. Born, educated, apprenticeship as mech. engr. in Scotland. 1915, engineer on submarine construction. After war, 2 years, asst. workshop mgr. Shanghai. Since 1923 continuously with Walworth Co., as tool maker, designer, past 12 years supervisor tool designing. Has developed many new tools, designs. Resides in Kewanee, Illinois.

S. R. MACK, Region No. 12. Apprenticed, draftsman with Am. Locomotive Works, Dunkirk, N. Y. Evening schools in mch. shop practice, tool designing. Grad. M.E.-I.C.S. 1916, Pierce-Arrow, tool maker, tool inspection, research. 1919 Jeffrey Mfg. Co. as tool inspector, tool designer, development and research. At present asst. chief tool designer, Curtiss-Wright Corp. Resides in Columbus, O.



C. G. ROSS, Region No. 5 Edu. Canadian Schools. Apprenticed at Robb Engr'g. Taught mech. drawing in R. I. School of Design. 1917 was Tool Engineer, Hopkins-Allen Arms Co. After war—Service Engr'g. Co. N. Y. C. and Mergenthaler Linotype Co. 1922 with Brown & Sharpe as Tool Engineer. At present tool & Methods engr. Union Spec. Mach. Co. Resides, Evanston, Ill.

N. H. LOU, Region No. 13. Early training in Copenhagen, Denmark. M. E. degree I.C.S. and LoSalle Extension course in Ind. Engrig. Spec. course at Ford Motor Co. 1927 at Ford as tool maker; 1929 tool inspector Glenn L. Martin Co.; t. r. foreman, chief Tool Engineer. At present asst. prod. engineer with Martin. Registered as professional eng. in Md. Resides in Baltimore.



C. J. LINDEGREN, Region No. 6. Ed. Worcester H. S. Am. Steel & Wire, also Drawing School 1912. Started 1905 with Am. Steel & Wire at 14, progressing to shipping clerk, machinist, drafting. 1909 to New Haven Works in chg. appropriations and construction. 1910 to Worcester as asst. to Gen. Mgr. 1916 with Crompton & Knowles Loom Works. At present asst. Supt. Resides, Worcester.

P. W. BROWN, Region No. 14, Born, Oakland, Calif. Joined aviation industry 24 years ago, after tool making, designing in Detroit, the Orient and other places. He has been responsible for tooling of the six plants of Wright Aeronautical Corp. and change-over to line production methods. At present is assistant works manager. Resides in Ridgewood, N. J.



IRWIN F. HOLLAND, Region No. 7. Apprenticed in tool making at Union Twist Drill Company in Athol, Mass., and worked as a machinist, supervisor, tool maker apprentice until 1915. Joined Pratt & Whitney Division of Niles-Bement-Pond Co. as tool maker and assistant foreman. At present is gen. supt. small tool and gage department, Pratt & Whitney. Resides in Hartford.

D. C. JONES, Region No. 14. 3 years Kansas State College in Mech. Engr'g. 1927 aviation ground school instructor, Heath Airplane Co. 1928-31 as travelair, mechanic, mfg. dept. head, jig bldr. 1931 Beech Aircraft supt. 1933-36 Vultee, jig builder, and tool maker. 1936-40, chief Tool Engineer. 1940 to date, plant engineer. Resides in Montebello, California.



W. B. PEIRCE, Region No. 8. Early training, Baldwin Locomotive 1897 to 1907 where he was apprentice machinist, tool maker, asst. foreman, asst. supt. and night supt. Then, in 1907 became works manager Buffalo Bolt Co., and in 1921 was president of Peirce-Brown Inc. Later wks. mgr. Graham Bolt Co., and at present works manager, Flannery Bolt Co. Resides in Pittsburgh.

C. E. LUCAS, Region No. 16. Studied I.C.S. courses in tool making, designing. Tool Engineering, Machinist, business administration. 1918 Woener Machine Co. machinist; 1919 tool maker, A. G. Stevenson Co.; general foreman. Incorporated latter company taking over gen. mgr. production, marketing own products. 1931 formed Lucas Screw Products Co. Resides in Rochester, N. Y.



C. O. THOMAS, Region No. 9. 1908-12 apprenticed tool and die maker, correspondence courses and night school training. 1917 tool inspector, foreman. Business for self, returned to manufacturing as supervisor, then tool inspection and gage supervisor. Now in charge, handling sub-contract division Eclipse Machine Co. sub. Bendix Aviation Corp. Resides in Elmira, N. Y.

E. H. NIEMAN, Region No. 17. Mr. Nieman's early training was "practical". By 1920 he was employed by the Carter Carburetor Company in St. Louis, Missouri as a tool maker until 1922. Became factory superintendent in 1922 and is at present employed by the same company and in the same capacity. Resides in Normandy—suburb of St. Louis, Missouri.



G. J. KELLER, Region No. 10 Tool making, correspondence courses in engineering, drafting. Foreman Bunting Brass & Bronze: supt. tools Cleveland Spring; general foreman, Westinghouse Electric and Mfg. Co., district mgr. Knox-Andresen Tool Co. sales mgr. Frontier Chuck & Tool; district mgr. Jones & Lamson. At present sales engineer with R. L. Crane Machinery Co. Resides in Buffalo.

E. V. JOHNSON, Region No. 18. Early training at Lewis Institute, Graduate M.E. Univ. of Ill. member, several honorary fraternities in Mech. Engr'g. After graduation was development engineer tool maker and time study engineer at Western Electric; mgr. time study dept., Kellogg Switchboard. At present "Firthite Engr." with Firth-Sterling. Resides in Dayton, Ohio.



GLEN ROBERTS, Region No. 11. Began mechanical career as solderer and machinist helper in canning factory. Has been engaged for twenty-three years in screw machine engineering—tooling, estimating, costs, machinery and maintenance, purchasing, general management. At present is president, Northwest Automatic Products Company. Resides in Minneapolis, Minn.

F. J. DIEHL, Region No. 19. Early schooling at Schenectady, graduating H. S. 1904, apprenticed tool and diemaker at Gen. Electric Co.; 1909 with Maxwell-Bristol Co.; 1911 at Chalmers; 1917-18 Bureau Standards; 1922 back to Schenectady in charge of radio tool design. At present asst. chief tool designer and asst. gen. foreman turbine dept. Resides in Schenectady.



















O. W. WINTER, 1st Vice-President

"Proper Use of Cutting Oils" by Walter Esau, E. F. Houghton Company. Philadelphia, Pennsylvania, Friday evening in the Concert Hall of the Royal York Hotel, the high light of the meeting-the Semi-Annual Meeting of the American Society of Tool Engineers-will be held. The principal speaker will be, none other than, The Honorable C. D. Howe, M. P. Minister of Munitions and Supply for the Canadian Government-and today's outstanding head of Canada's Industrial war effort. On the outbreak of hostilities, the Defense Purchasing Board became the War Supply Board and the Hon. C. D. Howe was drafted by the government to take charge of this important branch of Canada's war program. So rapidly did the work of this Board expand that it was necessary early in 1940, to organize it into a separate department-that of Munitions and Supplies. It is Hon. C. D. Howe's tremendous responsibility to organize and combine the flow of munitions and supplies from the Dominion abroad. The department has already awarded contracts amounting to many hundreds of millions of dollars for Canada and has made commitments for capital expenditures for plant construction and extensions running into more than \$235,000,000. In addition, orders for equipment and supplies for the United Kingdom amounting to vast sums have been made by the department.

On Saturday morning at 10:00 o'clock at the Royal York, the last technical session will be held. "Training Personnel" will be the subject of this session. Two speakers will discuss the topic from the standpoint of



RAY H. MORRIS, 2nd Vice-President

Industry's Task in training personnel and from the standpoint of Education's Task in these emergency times. R. M. Sherk, Director War Emergency Classes, Western Tech. Commercial School, Toronto, will discuss education's part, while the task of Industry in this effort will be discussed by Edward Kennard, Plant Manager, St. Catharines Steel Works, Ltd. St. Catharines, Ontario. This session will close the conference at noon Saturday, October 18th.

Plant Tours Offer Excellent Opportunity to See Real War-Time Production

The plant tours which have been arranged by the Toronto and Hamilton Chapters of the A.S.T.E. offer



HON. C. D. HOWE, M.P.

R.C., L.L.D., S.B., M.I.T. B.Sc., Minister of Munitions and Supply for Canada's Industrial War Effort, who will be Honored Guest and Principal Speaker at the Semi-Annual Dinner, Friday eve-



CYLDE L. HAUSE, Secretary

a most excellent opportunity to see real war-time armament production. It is a most gracious gesture on the part of Canada that Tool Engineers are to be permitted to enter and to see the many intricate and interesting phases of the manufacture of war material. Only by special permission from the National Government in Ottawa, have these unusual invitations been extended. Naturally some restrictions cannot be entirely eliminated. Tool Engineers, while specially privileged to make these tours, will have to notify A.S.T.E. Committeeman Len G. Singer, Toronto Chapter Secretary, 11 Front Street, East, Toronto, Ontario, Canada by October 9th to be sure of registration for the

Hints on Going to Canada

American visitors will encounter no difficulties in entering Canada. However, it is advisable for United States citizens to have adequate identification, so as to be able to return to the United States. American money is at a fixed rate of exchange at ten per cent. It is suggested that not too much American money be exchanged for Canadian money, as it may not be so easy to get back American money for the excess. Check on gasoline regulations at the border.

The Royal York Hotel in Toronto will be headquarters for the entire meeting—technical sessions, registration, Semi-Annual Dinner, starting place of all plant tours. There is a right *royal* welcome awaiting you there. We'll be there and we'll be looking for you.

A 50 MINUTE JOB A 7 TO 27 MINUTES

THIS NEW ADJUSTABLE SINGLE TURNING HEAD IS DESIGNED TO PERMIT FASTER SPEEDS AND THE USE OF CARBIDE CUTTERS

The job—machining a spindle gear from SAE 3150 steel forging. One of the difficult parts of this job is to get under tough scale with a heavy cut. With the new heavy duty Adjustable Single Turning Head providing more rigid setup to permit heavier cuts at higher speed, the heavy carbide cutters ploughed through scale and metal without damage to the cutting edge. Twenty-three minutes' turning time saved—and less time lost for tool regrinding.

In today's high speed production, it is important to get the full production capacity built into your Warner and Swasey Turret Lathe. Warner and Swasey modern bar and chucking tools will save many hours in both setup and production time... and your operator will be less tired at the end of the day because these tools make his work easier.

Do you have your copy of the Warner and Swasey Small Tool Catalog? If not, write today and learn the many possibilities for increasing production with these new improved tools.

Get MORE PRODUCTION

from

YOUR OLD AND NEW

TURRET LATHES

Send for the Warner & Swasey Tool Catalog Warner & Swasey, Cleveland, Ohio



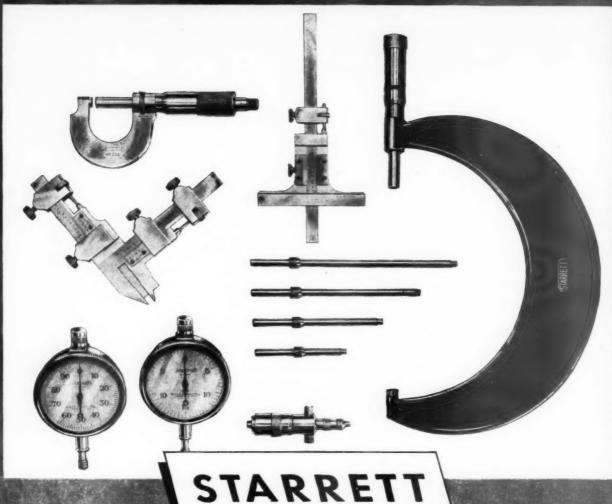
WARNER

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Turret Lathes

YOU CAN TURN IT BETTER, FASTER, FOR LESS...WITH WARNER & SWASEY TOOLS

This tool is available for No. 3, 4, 5, and 1A, 2A, 3A, 4A Turret Lathes. Turning capacity equal to swing-over cross slide.



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Accurate-Dependable
Since 1880

We pledge ourselves to protect and carry on the high standards set by our founder to the end that The L. S. Starrett Company shall continue to merit the distinction of the "World's Greatest Toolmakers" and that Starrett Tools shall continue to be known and accepted as standard for accuracy and dependability. Write for Catalog No. 26T.

THE L. S. STARRETT CO., ATHOL, MASSACHUSETTS, U.S.A.

World's Greatest Toolmakers

STARRETT

PRECISION TOOLS . DIAL INDICATORS . GROUND FLAT STOCK

Producing Threads

By W. E. PARISH
Tool Supervisor, Crouse Hinds Co.

THREADS of large diameters are avoided where possible because large taps and dies are very expensive and chasing a thread with a single point tool is comparatively slow and likewise costly.

When producing threads in tough or stringy metals with a single tool, or taps and dies, it is difficult to obtain a smooth finish because the flow of chips at the point of the thread is such that metal cut from one side of the groove interferes with metal being cut from the other side.

A new inexpensive tool has been patented which will produce smooth internal or external threads on an economical basis. This tool is used the same as a single point tool, except that the thread is cut completely with one pass for ordinary work or two passes for the better grades.

A set of discs made for a given pitch thread will produce external threads of any diameter, or internal threads large enough for the tool to enter.

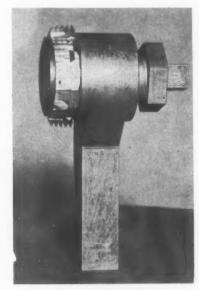
This tool consists of five discs, each being the thickness of one pitch, mounted on an arbor in a special patented holder.

The first three discs are of different, gradually increasing diameters. These discs rough cut a groove equal to the finished depth of thread, but of a lesser angle. The fourth disc finishes one side of the thread, and the fifth finishes the other side.

With this construction it is possible to grind the correct top rake on the first three discs as on dies and chasers. But the fourth and fifth discs can have the correct top rake ground at right angles to the cutting edge, thereby allowing free flow for chip disposal.

When top rake is changed on conventional tools for various metals, the form of thread is also changed. That is not true with this type of tool. The only correction for thread forms necessary is to allow for the amount the tool is ground below center to provide front clearance. This can always remain constant.

The tool holder consists of a shank, a coarse pitch threaded bushing in which is threaded a finer pitch arbor, having a key to hold the cutting discs in relation with one another). Left hand threads are used on holders for cutting external threads and right



Thread Producing Tool
Completely cut in one pass for
ordinary work.

hand threads are used on holders for cutting internal threads.

This construction permits easy adjustment for placing the tool on center and the heavier the cut the tighter the discs are clamped together.

The above picture shows a tool ground for cutting silicon aluminum 12 pitch threads. Less top rake should be used for harder metals.

Hartford Cooperates in Educational Program

IN keeping with the A.S.T.E.'s report on the current needs of the Machine Tool Industry for more than 110,000 Tool Engineers, and larger numbers of production supervisors, tool room men and machine tool oper-

ators, the Educational Committee of the Hartford Chapter of the A.S.T.E. has concentrated this year's efforts to giving immediate assistance to National Educational emergency training programs.

Several of the members personally attended, as instructors or students, last winter's initial classes of the Engineering Defense Training Program. In view of their progress, the Chapter has this year offered its full cooperation to this National Defense Emergency training program. Classes are conducted from twelve to fifteen weeks, approximately three hours per night and mostly one night per week. They provide a threefold source of assistance by:

 a. serving as a refresher course to technically trained men detailed to handling new types of work.

 giving intensive technical training in one or several subjects to men or women with practical experience, who are otherwise eligible for up-grading to more vital positions.

serving as Forum for the immediate solution of the many new engineering and production problems confronting these students during working hours.

Federal Funds have been provided for the free tuition of accepted students, and the cost of books, etc. are restricted to a minimum.

The subjects related to the field of Tool Engineering as presented during the Fall Term of the Hillyer Defense Program, Hillyer Junior College of Hartford, Conn. are: Metallurgy, Operations Analyses, Basic Engineering Mathematics, Machine Design, Tool Engineering, Applied Mechanics, Engineering Drawing, Production Principles and Methods.

As one of the major problems is to bring the opportunity of enrolling in these Defense Courses to those men and women who can profit most, each member of the Chapter has been requested by letter to personally participate in this patriotic and civic endeavor by recommending and encouraging eligible members of their own organization and others to enroll in these courses. In addition a number of members will be called upon to assist in the interviewing of the prospective students, prior to the opening of the courses, and to occasionally direct classroom forums or lectures, in which they are particularly qualified.





CINCINNATI HYDRAULIC UNIVERSAL GRINDING MACHINE



THE many features of accuracy, versatility and easy operation, so successful in CINCINNATI 12" Hydraulic Universal Grinding Machines, have been incorporated in three larger and heavier sizes. These new machines are of particular value in grinding large work, both internal and external; production work; conventional tool room jobs requiring straight cylindrical, multiple diameter, shoulder, taper, bevel, and face grinding operations.

Below—Grinding the bore of a large sleeve gear on a CINCINNATI 14" x 72" Hydraulic Universal Grinding Machine. The hinged internal attachment, standard equipment with the machine, is always in place and may be set up at a moment's notice.

CINCINNATI GRINDERS INCORPORATED

CINCINNATI, OHIO, U. S. A

PRODUCTION PERSPECTIVES.

News of Mass Manufacturing Everywhere



ACHINE tool shipments in August totalling \$64,300,000 were the highest on record in the history of the industry, it was reported today by the National Machine Tool Builders' Association. Shipments reported for July were \$57,900,000 and for June \$63,000,000. In August a year ago shipments were estimated at \$40,800,000.

Placements rose above the level of the previous week for the first time in five weeks, the Michigan State Employment Service reported today. The 6 per cent increase was principally due to heightened industrial activity in several manufacturing centers.

A further reflection of increasing manufacturing operations appeared in a slight decline in the total number of registrations for work from the preceding week and in the 16 per cent drop in new registrations. Total registrations dropped from 11,615 to 11,530 and new registrations from 5,977 to 5,009.

A 47 per cent drop—from 23,106 to 12,211—in the number of initial claims for benefit payments filed this week seemed to prove that the peak of seasonal layoffs has been passed.

Continued unemployment of laid-off automobile workers is largely responsible for the sharp rise (66 per cent to 97,495) in the total number of continued benefit claims filed. Due to an increase in the number of claims in the waiting week period (115 per cent), another large addition to the continued claim list is expected for next week, but the average number of weeks for which benefits will be paid is expected to be much lower this year than in 1940 because of shorter lay-off periods.

ower this year than in 1940 because of shorter lay-off periods.

Affecting manufacturers interested in marketing their prod-

Regulations have been revised lifting the prohibition on use of 143 different materials from other than domestic sources. These materials, ranging alphabetically from "abrasives" to "zirconium", may now be used regardless of their country of origin in the making of supplies or equipage for procurement by the Army.

Specifications accompanying all bid invitations issued by the office of the Quartermaster Supply Officer at the San Francisco General Depot, Fort Mason, when those bids are to furnish the Army items which might contain any of the 143 materials, now contain a statement including a list of these materials which no longer must be mined, produced or manufactured wholly from within the United States.

The Jessop Steel Company, Washington, Pa., has begun construction of a new 84-inch, two-stand plate mill, according to an announcement by Harry Wilson, Jr., Works Manager. This is part of a large plant expansion and modernization program being undertaken by Jessop in the interests of National Defense, since the tool steels, stainless steels, and special alloy steels they manufacture are vital to armament production.

WESTINGHOUSE will build a \$22,000,000 plant to manufacture steam turbines and gears for merchant ships for the United States Maritime Commission under a lease agreement with the Defense Plant Corporation, a subsid-

iary of the Reconstruction Finance Corporation, R. A. Mc-Carty, Westinghouse Vice-President announced. The plant will adjoin the South Philadelphia Steam Works. More than 1,500 workmen will be employed.

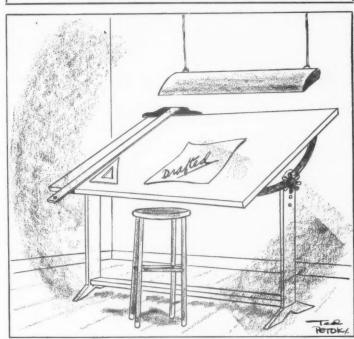
The merchant marine ship equipment shops will be a self-contained production unit. Constructed of steel, concrete and brick the building will be 1,170 feet long and 490 feet wide. The shop represent a 25 per cent increase in manufacturing space in the South Philadelphia Works.

Manufacturing equipment will include 16 big machines to cut teeth on steel marine gears. These gear-hoppers will be enclosed in air-conditioned rooms so that temperature changes will not affect the finish. The new shops will make approximately 1,200,000 stainless steel turbine blades a year. Steam turbines to be delivered annually by the plant will have a total capacity of 630,000 horsepower, enough to drive 100 ships carrying 1,000,000 tons of cargo.

New appointments to executive positions in connection with the manufacturing addition are: W. F. Stegemerten, assistant manager of manufacturing of the South Philadelphia Works. W. W. Covington succeeds Mr. Stegemerten as superintendent of equipment and methods.

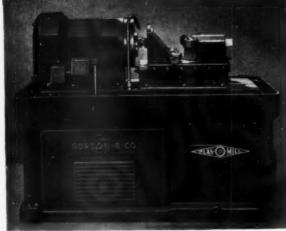
HOW industry and the government can work together to save on materials needed for National Defense was shown recently when the RCA Manufacturing Company made known that, on one item alone, there has been more than 66,000 pounds of aluminum conserved by the substitution of steel in the manufacture of radio receiving set cases for the Army.

RUSH ORDER!



Drawn for THE TOOL ENGINEER by Ted Petok





 Higher hourly production, higher percentage of perfect parts, lower cost per part —that's the record of Plan-O-Mill thread and form-milling machines.

Twenty-five years of tool experience are behind Plan-O-Mill. Scores of user reports testify that Plan-O-Mill significantly increases the production minutes in an hour.

Large, cumbersome pieces are easily handled, for the work is fixed—all motion is in the milling head. It is also the fast, economical way to combine threading and concentric spot-facing or chamfering.

Because Plan-O-Mill is an essential defense tool, widely used in aircraft and munitions work, orders can be promptly filled, deliveries made. Particulars gladly furnished on request.

The GORDON-R-CO.

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Detroit, Mich., John E. Livingstone Co., 2921 E. Grand Blyd.
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New York, N. Y., Wilson Brown Co., 405 Lexington Ave.
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Dayton, Ohio, F. P. Kawsky, 112 Delaware Ave.
Chicago, Ill., E. L. Essley Mach. Co., 825-845 W. Evergreen Ave.

-PRODUCTION PERSPECTIVES-

The Ohmite Manufacturing Company, engaged exclusively in the manufacture of quality rheostats, resistors, tap switches, and chokes, has recently completed an addition to the factory on West Flournoy Street in Chicago.

The enlarged plant, extending the frontage to several hundred feet, doubles the production space and greatly expands the company's facilities to take care of the increased requirements for Ohmite Products in Industry and National Defense.

A series of 16 huge lathes for machining big guns and other defense items for the United States Navy are now being assembled in the Pittsburgh plant of the Mackintosh-Hemphill Company, Colonel J. S. Ervin, president of the company announced here today. According to Colonel Ervin the lathes are of the "heavy duty engine" type and are among the largest ever constructed.

Looking ahead toward the time when the vast increase in productive capacity for cemented carbides for defense production needs will become available commercially, Carboloy Company, Inc., major producer of cemented carbides is building its exhibit at the National Metals Show around future uses of carbides in addition to dramatizing the important part Carboloy standard tools are playing in speeding Defense production.

To help relieve a shortage of machine tool equipment the OPM asked Fisher Body to manufacture 100 mammoth planers because the company which normally builds them had insufficient capacity.

Backed by the tremendous resources of General Motors and more than 30 years' experience in fabrication of the huge dies and special tools needed in automobile body manufacture, the body-building division swung into its new task. Less than two months after the contract was signed the first planer was delivered by the Grand Rapids, Mich., stamping plant. Furthermore, it agreed to build 125 instead of 100, and in only 10 months time. Ordinarily six months are required to build even one.

Notwithstanding a five hundred per cent increase in the production of Kennametal during the past twelve months, production will be doubled again by December, 1941, according to an announcement by Philip M. McKenna, head of McKenna Metals Company, Latrobe, Pa.

In its new plant and office building in Chicago, the Charles Bruning Co., Inc., manufacturers of sensitized papers and Black and White printing and developing machines, has provided a modern machine shop in every sense of the word.

A MODERN, 24 ft. annealing furnace has recently been installed by Joseph T. Ryerson & Son, Inc., for annealing their stock steel products after they have been flame cut. Usually it is not necessary to anneal after flame cutting. However, with some types of steel, occasionally in the case of plates, and in some situations this is desirable.

One of the long-idle blast furnaces of the former Granite City Pig Iron Company again went into the production of pig iron recently. The plant was purchased recently by Koppers United Company and has been rehabilitated to produce 700 gross tons of pig iron a day, about half of which will be delivered in a molten state to nearby Granite City Steel Company. The remainder will be shipped to other firms, most of which are located in the St. Louis district. Total annual production will be about 250,000 tons a year. Rebuilding of the blast furnace was begun late last June and has been rushed to completion to alleviate the critical pig iron shortage.

In recognition of continuous service in the employ of the company for ten years and twenty years, Farrel-Birmingham Company, Inc., of Ansonia, Conn., and Buffalo, N. Y., recently awarded service emblems to 577 employees who have completed either of those terms of service.



No reduction in the cost of tools could be enough to overcome inferior performance. Fortunately, Molybdenum high speed steels, which cost less than the Tungsten types, combine lower purchase price with equal performance.

Users know that improved cutting properties, better

toughness and lower cost progressively bring about tool cost reduction.

It will pay you to call in your supplier for the analysis and heat treatment of the Molybdenum high speed steel that is most suitable for your cutting and cost requirements.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED . FERROMOLYBDENUM . CALCIUM MOLYBDATE

Clima Toly Penlim Company

Plastics

as Materials of Construction

By H. M. RICHARDSON

Engineer, Plastics Department General Electric Company, Pittsfield, Mass.

THERE are many ways to look at Plastics, because of their variety and versatility of application. They might be considered for their electrical insulating properties—or for their decorative and colorful characteristics in the field of consumer merchandise. They would still be Plastics but not necessarily the ones that Tool Engineers would use in the course of their daily work. Consequently, my approach to the subject will be to give a brief outline of the whole field

of Plastic materials and then pick from this large group the ones likely to be most useful to Tool Engineers, and examine these more closely.

Plastics, as we know them today, are primarily synthetic organic materials made largely from six chemical elements: Carbon, hydrogen, oxygen, chlorine, nitrogen and sulphur.

All are amorphous, resinous materials, used either alone or with fillers or plasticizers to provide the necessary form-stability, shrinkage and flow characteristics. Their chemical structure is complex, but in general they are derived from abundant and low-cost ultimate raw materials. Certain other materials are also plastics, in that they undergo plastic flow during their molding or forming—like glass, clay products, and rubber—but these will not be included.

General Types

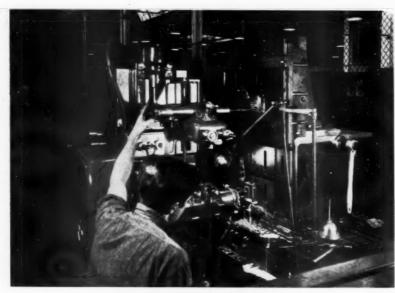
Plastics can be classified into three general groups, which we call the thermosetting plastics, the thermoplastics and the elastomers. They are defined as follows:

Thermosetting Plastics are those materials which, under heat and pressure undergo plastic flow and which, on further application of heat, become infusible and insoluble, so that on further heating they cannot be remolded.

Thermoplastic materials are softenable under heat, and readily molded to the desired shapes, but must be cooled below the softening point to retain their shape. On re-heating the thermoplastic materials can again be softened.

Elastomers are vulcanizable, rubber-like plastics which, when molded and cured, are no longer readily softenable, but are tough, elastic bodies, similar to rubber compounds, but not involving the use of natural rubber.

Under these various classes are several types. For example, the thermo-



Keller Machine Hobbing Plastic Part
"primarily synthetic organic materials."

Marilable!

SHANDARDIZED

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AND ADAPTERS

NATIONAL STANDARD AND BROWN & SHARPE TAPERS

SHELL END MILL ARBORS COLLET HOLDERS

CONVERSION ADAPTERS

CULTER CHUCKS

SLEEVES AND SOCKETS

CUTTER CHUCK ADAPTERS

CHUCK MOUNTS

CUTTER ADAPTERS

CENTERING PLUGS

SPRING COLLET HOLDERS

MUSCEL LANEOUS ACCESSORIES

WRITE FOR NEW ARROW CATALOG No. 450 CONTAINING DETAILED INFORMATION

SCULLY-JONES AND COMPANY
1901 SO. ROCKWELL ST., CHICAGO, ILLINOIS

setting plastics consist broadly of two types—the commoner of which is the large variety of phenolic plastics based on the use of phenol formaldehyde resin. It is from this group that we find most of the mechanical and electrical applications of plastics. By various modifications of the resin, and by proper selection of filling materials, a very broad range of combinations of physical and electrical properties can be obtained. For example, wood-flour filled, phenolic molding compounds are made up in very large quantities for general-purpose molding, where intricate pieces must be made, where greatest economy of manufacture is desired, and where the ultimate in toughness, heat-resistance and impact strength are not required. Other fillers are used to provide greater toughness and impact strength, with generally lessened ease of molding. These fibrous fillers are alpha cellulose flock, cotton flock linters, or chopped fabric. To provide

higher heat-resistance, inorganic fillers such as asbestos are used. To provide low dielectric losses at high frequency, certain modifications of the resin are made, and a filler of ground mica is used. To obtain maximum resistance to moisture, modifications in the resin and process of compounding are made, and in some cases non-absorbent fillers such as ground cured resin are used. Phenolic plastics are also built up from laminations of sheet material (either paper or fabric, cellulose, asbestos, or fiberglas), previously impregnated with the proper type of phenolic resin. The laminated materials are made in a large variety of grades, each of which has some outstanding characteristic-ease of fabrication, low moisture absorption, high dielectric strength, low dielectric losses, high mechanical strength, and toughness, resistance to abrasive wear, ease of machinability, heat-resistance, and so on.

You see from this that it is necessary to know the entire group of materials available when choosing the right one for a given application. There are about sixteen different major modifications of phenolic molding compounds, not counting variation in color and plasticity, and about a dozen major grades of phenolic laminated materials.

Clear Plastics

The other principal type of thermosetting plastic is the aminoplast. These resins and compounds are made by reacting formaldehyde with urea, or with melamine or some other nitrogen-bearing compound of similar type. These resins are clear, waterwhite materials which can be made into white, translucent, or brightly colored compounds, either for molding or laminating. This freedom in color and translucency is the principal reason for the rapid growth and acceptance of these aminoplast resins. In general they are not quite as good as the phenolic resins in their resistance to heat and moisture, but the phenolic resins cannot be made white and light colored, with good color stability, while the aminoplasts are excellent in this respect. Incidentally, the aminoplasts are also quite resistant to Tacking or surface carbonization, under the electric arc, or from surface leakage currents where used

The FIRST CUTTING COMPOUND

Developed Especially for CARBIDE and other

VERY HIGH SPEED CUTTING TOOLS

THE rapidly increasing use AQUAMIX of carbide and other high **Liquid Cutting Compound** speed tools emphasizes the immediate importance of this Try It Quickly and Soo original type of cutting fluid. The Difference STUART'S SOLVOL Liquid Cutting Compound was developed especially for this exact condition. Where operations run "too hot" for properly applied straight cutting oils — and where ordinary soluble cutting oils or soluble paste compounds fail to produce satisfactory finish or tool life - that's the place for this original Stuart Oil development.

WIRE TODAY for working sample — FREE to any industrial concern working on defense orders. To assure proper application please tell us name of part, stock, machine and cutting operations.

D. A. STUART OIL CO.
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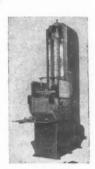


Visit us in Booth C-1, National Metal Congress, Philadelphia, Oct. 20-24.

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Write for information about the wide use of the Sheffield Electrigage.



THE SHEFFIELD

CORPORATION

Gage Division - DAYTON, OHIO, U.S.A.



as electrical insulation. They have a decided advantage over the phenolics in this particular respect.

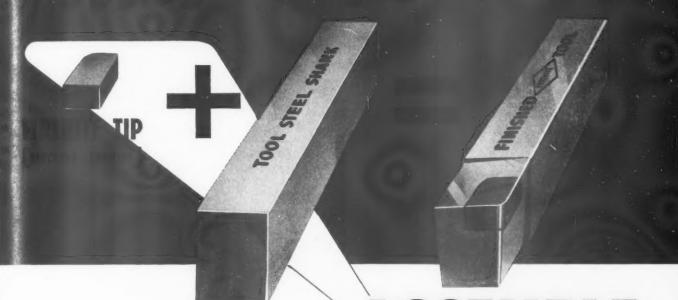
The next class-the thermoplastic materials, include several types. By far the largest group this class offers are the cellulose plastics. These include cellulose nitrate, which is the ordinary celluloid-the oldest of all of the synthetic, organic plastics, discovered and put into commercial use in this country shortly after the Civil War. It has excellent mechanical properties but is extremely inflammable, but even with this draw-back it is very widely used. Another group, the cellulose acetate, or acetate butyrate plastics, are rapidy displacing the cellulose nitrate because of their slow-burning characteristics, making them much safer for use. For example, photographic safety film is made of cellulose acetate, while the old inflammable film was of cellulose nitrate. Cellulose acetate and acetobutyrate are used in great quantities in the injection molding process. Injection molding is to plastics fabrication as die casting is to metal fabrica-

New Vinyl Resins

Another group in this class is the vinyl resins which have increased rapidly in availability in the last few years. A leader in this field is plasticized vinylchloride, which is made and sold by B. F. Goodrich Rubber Company, under the trade name "Koroseal". In this form it is a rubber-like material which is very resistant to oils, acids, alkali, et cetera, and finds its use in the form of gaskets, protective coverings, wire insulation, and many other places. A close relative of this is the vinylchloride, vinylacetate copolymer sold in the open market by Carbide and Carbon Chemicals Corporation under the trade name "Vinylite". This is made in many forms all the way from rubberlike materials up to rather hard, rigid molding compounds. The rubber-like materials are equivalent to Koroseal while the harder materials are equivalent to cellulose acetate, or celluloid.

Potentially, these vinylchloride plastics are the lowest cost of any in this group, and you may expect to see wider and wider applications of them during the coming months.

A third group in this class includes



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DETROIT

the vinylacetals which are made by reacting vinylacetate—a soft, sticky, plastic material—with an aldehyde such as acetaldehyde, formaldehyde or butyraldehyde. The resulting plastic is entirely different from the original vinylacetate. The acetaldehyde product is a rather hard and somewhat brittle resin which sells under the trade name of "Alvar".

The formaldehyde modification is extremely tough and strong, and sells under the trade name of "Formvar".

A modification of this material is very widely used as a wire covering, particularly on small diameter magnet wire.

Safety Glass Plastic

The butyraldehyde modification is soft, flexible and very tough, and is very widely used as the interlayer in safety glass.

A fourth group in the thermoplastic class is the acrylic resins. These are known by their trade names, "Lucite", "Plexiglas", and "Crystalite". They are characterized by extreme clarity and by high strength and toughness. One of the principal present applications of this type of resin is for the wind-shields and cockpit covers on aircraft; first because of its crystal clarity, and second because of its ease of fabrication into formed shapes, and the fact that it does not shatter on impact. Modifications of these resins are suitable for



Plastic Rocker Arms Where strength is required.

molding and are widely used—particularly where their optical characteristics are of advantage.

A fifth group consists of the styrene polymers. These are somewhat similar to the acrylics because of their clarity, although not quite as good in this respect. The outstanding characteristic of the styrene resin is its electrical properties. It has extremely low dielectric losses at high frequencies and for this reason is suitable for use in ultra-high frequency radio applications. Also, styrene resins have the lowest moisture pick-up of any resins yet discovered. As to their mechanical characteristics, they are somewhat harder and more brittle than the others and have a metallic sound when struck.

I might include also in this class, a sixth—the polyamine resins. The first representative of this group to come on the market is du Pont's nylon. This material is extremely tough and falls in an entirely different class from the rest of these thermoplastic materials in that its softening



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The swift and gigantic steps that American industry is taking in the program for national security are largely due to the precision production of metal parts. When the present emergency is ended, the record will show that one of the outstanding accomplishments was the production of defense material, not only in stupendous quantities but with each vital metal part repeatedly held to an extremely high standard of accuracy in size and finish. Today,





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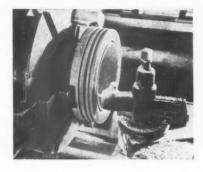
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For full details on THOR Riveting Hammers and other Airplane Tools, write for your copy of the new THOR Airplane Tool Catalog. point is quite high; about 285 degrees, Centigrade — against all the others which soften at temperatures below 100 degrees, Centigrade. Nylon has found its principal use as extruded and cold-drawn filaments. Here it is used for brush bristles, or in very fine filaments to replace silk. I understand that a very large amount of nylon is being used for fabric for special defense applications.

Speaking of drawn filaments, some of the vinyl resins—particularly vinyl-chloride copolymers, are made into fibers. These are known by the trade names of "Vinyon" and, "Saran".

The third class, the elastomers, include three types. The first, the most publicized of those to date, is chloroprene, which du Pont Company manufactures and sells under the name of "Neoprene". It is derived from acetylene and chlorine. Its principal use is to take the place of rubber, where resistance to ageing and to solvent action or oils is required. This material is so good in this respect that it is necessary for du Pont to greatly



increase its capacity. The present output is going largely into defense applications.

Another of these vulcanizable elastomers is Thickol, which is derived from refinery gases and sulphur. This is quite widely used in the making of gasoline hose and other solvent-resistant applications in place of rubber.

Rubber Substitutes

The third group consists of the butadiene copolymers sold under the trade names of "Buna", "Chemigum" and "Hycar". These types of synthetic rubber were first developed and extensively used in Germany and Soviet Russia, in an attempt to produce rubber for tires and make these countries

OCTOBER, 1941

independent of an outside source of natural rubber. In Germany the starting material for the principal ingredients is acetylene. In this Country the butadiene is made from petroleum, usually from the refinery gases which previously had a limited market. By this means the United States can probably provide itself with the lowest cost synthetic rubber in the World, but even so the cost of synthetic rubber will probably not soon go below 25c per pound, which is a high

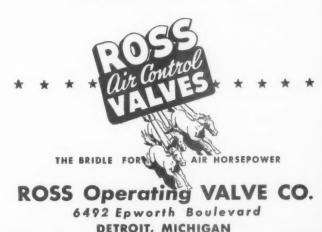
price for natural rubber. The present price of some of these synthetic rubbers is about 77c per pound, so you see they have a long way to go before they can compete with natural rubber in price. Furthermore, the price of natural rubber will always be low enough so that on applications where rubber is suitable it will be the proper material to use.

In the field of machine design one must go over this entire list and pick out the specific ones which are most



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likely to be suitable and choose structural materials from these groups which have properties suitable for the design at hand. In the past, most of the mechanical applications for plastics have come from the thermosetting phenolic plastics and these too were limited to the stronger and tougher grades. One of the first of such applications was non-metallic gears, made out of canvas-base laminated, phenolic plastics. These have been, for the last twenty years, or more, sold under the trade names of "Textolite", "Micarta", "Formica" and "Celoron"; "Synthane", "Fibroc" and so on. This laminated plastic gear material was a natural outgrowth of the fabroil gear which had been developed back in 1908 by the General Electric Company-the difference being that the Fabroil gear used compressed cotton which was held together under compression by means of steel end plates, and a series of studs, while in the phenolic lamin-

ated gear stock the compressed cotton fabric is bonded together and held under compression by a thermosetting synthetic resin. In addition to gear wheels and pinions made of phepolic plastics there has been a large number of other applications such as friction disks, clutch cones, pulleys, cams, rollers and bearings. Some of these applications deserve particular note. For example, cams made of a special phenolic laminated material which contains an appreciable amount of graphite have proven themselves to be much more suitable for highspeed machinery than metal cams. In the first place, they wear longer, owing to their resilience and self-lubricating qualities and in the second place, with their much lower momentof-inertia, they allow much faster starts and stops.

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Laminated Bearings

Another mechanical application of note is phenolic laminated bearings. By far the largest application for bearings of this sort is on the necks of steel mill rolls. Here the pressures are very high, running from 500 pounds per square inch up to as high as 7,000 to 8,000 pounds per square inch, and the lubrication is water. In this application, laminated plastic bearings outwear the previous bronze and babbitt bearings all the way from 2 to 50 times, and in addition give power savings in the over-all operation of the mill amounting to all the way from 15 per cent to 60 per cent. Many of these installations have been truly phenomenal in the savings which have resulted.

The field of application of plastic bearings in the smaller sizes, on machinery with oil lubrication, has been somewhat more limited. In the first place it is very fundamental that some means be provided to carry away the heat of friction from the bearing. In the case of steel mill bearings, the water lubrication does a good job of this, but in the case of a machine bearing with oil lubrication, unless a circulatory system is provided, the heat of friction must be dissipated through the journal, since the bearing itself is an excellent heat insulator and very little of the frictional heat will pass through the bearing lining into the frame of the machine. As a

THE TOOL ENGINEER





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ETTCO TOOL CO.

586 Johnson Ave., Brooklyn, N. Y.

DETROIT

CHICAGO



consequence of this, the laminated plastic bearings find their economical uses in applications involving high impact. For example, the connecting rod bearings on a nail-heading machine, or the bearings on a sand-slinger in a foundry, are applications where oil-lubricated Textolite bearings have shown substantially increased life over the previous bronze or babbitt bearings.

The molded phenolic plastics find their use in machinery, usually as a part of the electrical control system, such as terminal blocks, housings, or other integral parts of the electrical system.

Business Machines

In the field of business-machine equipment we have not only these insulating uses but also actual housings for the machine itself, as exemplified in adding machines, counter scales, food grinders, and cash registers. Of course there are other incidental uses such as operating knobs, wheels, handles, dials, etc., which are very readily and satisfactorily made in phenolic plastics, or of the white or light-colored aminoplast compounds.

In the field of thermoplastic materials we find oil-proof insulated wire for use on machine tools in which the insulation is polyvinylchloride. This same plastic is also used in many places for gaskets and oil seals.

Another of the vinyl resins—the Formvar—is modified and used as wire insulation on most of the motor and control devices used on machinery and machine tools.

Nylon filaments are now used in industrial brushes, taking the place of bristle or Tampico fiber.

Of course you are familiar with the uses of synthetic rubber-like Neoprene and Thiokel for oil-resistant



Operations on Plastic Parts Drilling, burring tapping.

seals, gaskets, protective boots, and other applications where a material with rubber like properties is required, but where oil-resistance is necessary.

In designing for the use of plastics in machines it is desirable to get in touch with the manufacturer or fabricator of plastic materials and discuss with his engineers the proposed use so that they will have the opportunity of giving their suggestions and modifications which will allow the most economical final design. This industry, while it is relatively old insofar as some of its branches are concerned, has been undergoing a rapid transformation during the past 10 or 12 years so that many of the things which were impossible in plastics 8 or 10 years ago can be attempted now. And, in addition to this, there are

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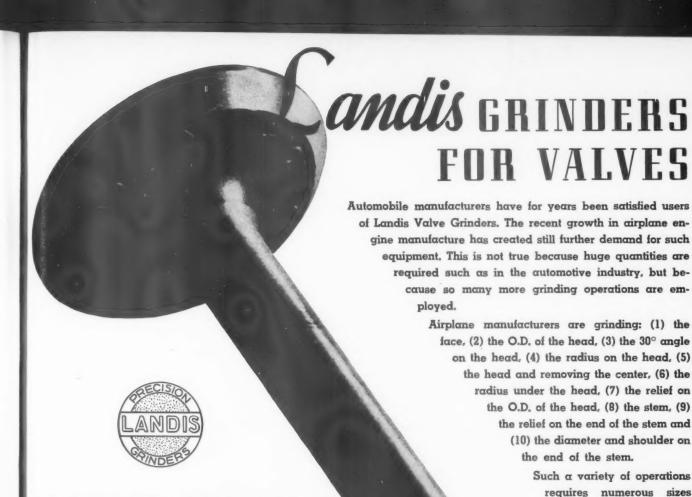
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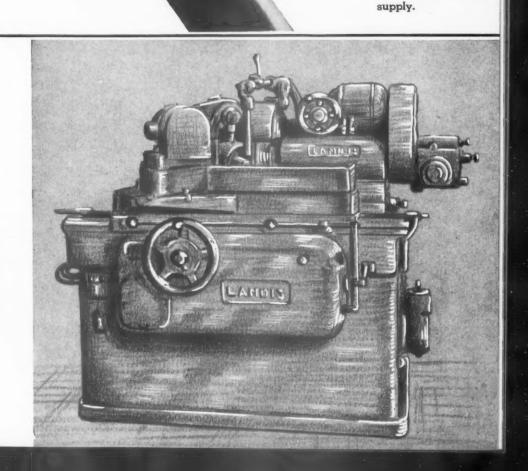
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The most common of all the valve operations is the grinding of the face. For this a specialized machine designated as the Landis 6" Type C Hydraulic Valve Face Grinder has been developed. It may be arranged to grind a variety of face angles up to 60° and may even be tooled in such a manner that the O.D. of the head may be ground without equipment change. The grinding cycle is automatic. Concentricity of the valve face with the stem may be consistently held within a limit of .0005". This machine typifies the kind of engineering service Landis is now making available to valve manufacturers of all kinds. No. 371

SEND FOR CATALOG G-40



and types of equipment, all of which Landis is in a position to further applications of plastics which can be expected to bear fruit within the next new years. One of these is the production of large molded pieces from felted preforms of fibrous material into which the resin has been incorporated. This is the way an automobile company is attempting to make a plastic body for a car and I expect that parts from many other types of devices will be made by this manner. Probably some of these other applications, as for example panels

and doors for household appliances, may get into production before the plastic bodies of the automobile. Elements of furniture may be made in this manner.

Plastic Furniture

And while speaking of furniture, I suppose you have read about the use of extruded plastics in the field of furniture, to take the place of reed for woven seats and backs, or to provide trim strips for edges and corners of

furniture. So far in this country the extrusion of plastics has been limited to the thermoplastic group, following in general the practice which has been used in the extrusion of rubber for many years. Methods of extruding the thermosetting plastics have been developed abroad, but have not been used in this country to any great extent, because most of such applications are filled by the use of non-ferrous metals in this country. A continuing shortage of some of these nonferrous metals may bring extruded thermosetting plastics into the market, although I would expect the nonferrous metals to take this market back after the scarcity has been removed. And while we are on the subject of scarcity, it appeared only a few months ago that there would be plenty of raw materials to take care of not only the ordinary needs of the plastics industry, but for a substantial increase in volume in applications replacing aluminum, magnesium and zinc, and a very rapid trend started in that direction. It took only a short while, however, to pick up what slack there was in the raw material situation, so that there is at present a rather acute shortage of formaldehyde, which will probably be relieved this fall or winter. Additional equipment for the manufacture of phenol is being installed, as well as for other plastic raw materials such as vinylchloride, styrene urea, melamine, chloroprene and butadiene.

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Airplanes, too

The plastic airplane differs only from the old plywood airplanes of the last war in the fact that instead of using animal glue or casein glue, there is now used a synthetic resin adhesive made of phenol-formaldehyde, ureaformaldehyde, or polyvinyl butyral. The process involves taking wood veneer-usually spruce, for the lightest structures, or birch for stronger structures, and sometimes mahogany in thickness from about 1/40 inch to 1/10 inch, and applying the adhesive either as a viscous liquid or as a film, and then subjecting the structure to heat and pressure, causing it to stick together, and then cooling and removing from the molding equipment. The molding equipment can take the form of a metal mold or of a mold which



THE HEALD MACHINE COMPANY

WORCESTER, MASS., U. S. A.

consists of one rigid half and one flexible member, such as a rubber blanket with hydrostatic pressure behind it. It may, also, as in the case of some manufacturers of aircraft parts, consist of building up the laminations of plywood on a form and then placing the whole assembly inside of a rubber bag and exhausting the air from it, and placing the assembly, bag and all, into an autoclave, and subjecting it to hydrostatic pressure under hot water with sufficient pressure to cause the

material to bond together and with sufficient heat to cause the resin to flow and cure.

There are enough people working on the various schemes of making molded laminated plywood structures for aircraft that I think it is reasonable to expect that after the present defense activity is over, commercial planes will probably be made in this manner wherever designs can be produced in sufficient quantity to warrant the setup.



Detroit Marketers Building Bibliography

The Industrial Marketers of Detroit, Detroit Chapter of the National Industrial Advertisers Association are sponsoring a national project for the benefit of American Industry in the training of skilled workmen for the national defense production program.

This project is the compiling and distributing of a complete bibliography to governmental and private defense training agencies of educational literature produced solely by industrial manufacturing concerns.

In order to complete the compiling of this bibliography, the Industrial Marketers of Detroit have called upon the cooperation of all industrial societies and associations. Outstanding among the groups cooperating is the American Society of Tool Engineers.

If you are an industrial manufacturing concern who has produced educational training literature, write a letter (sending samples of the literature which you cover in this letter) to Lansing Moore, Chairman, Industrial Marketers of Detroit, Educational Literature Survey, 900 Donovan Building, Detroit, Mich. Here is the information which is required:

- (1) Title of literature.
- (2) Number of pages.
- (3) Type of products dealt with.
- (4) Brief general summary of ground covered by literature.
- (5) Whether literature is written in technical or layman's language.
- (6) Whether literature is available free, or the cost per copy.
- (7) To whom shall the request for literature be addressed.

Ryerson Adds Connecting Bridge

Among the latest additions necessitated by extraordinarily heavy customer requirements at Joseph T. Ryerson's 21 acre steel-service plant in Chicago is the new connecting bridge between two main office buildings.

When completed, the 66 foot glassedin span will hasten the flow of work between departments and considerably speed customer service. Ordinarily, expanding office operations are cared for by large reserve space provided for such contingencies, but rapidly spiraling office activities forced several departments to occupy larger quarters with more working space. Quicker, more efficient service is expected to follow this



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Recent Developments in

Priority Control

Priorities restrictions have progressed from lip service to rationing; now bring all strategic materials under strict control. Here is an account of how Priority Control is handled today.

FROM the initial tooling-up stages, the national defense effort has progressed to a full-swing production phase, and in this change, there is important significance to the tool industry.

While the demand for machine tools will still be one of the major requirements of the defense effort, the By A. N. WECKSLER Washington, D. C.

expansion of all industry not strictly of a defense nature has been practically suspended. The emphasis will be placed largely on maintenance and repairs for all but war industries.

Priorities restrictions, which have

in the past six months progressed from mild lip service toward rationing, now bring all strategic materials under strict control.

As Priorities Director, and executive director of the Supply Priorities and Allocations Board, Donald Nelson will make every effort to bring this country's industry into line with a full war-time economy. To accomplish this will require drastic curtailment of all consumer durable goods, with the diversion of raw materials normally used in such production into the production of defense material.

As an example of what such curtailment could mean in a so-called "allout" defense effort, sales of passenger automobiles in Britain were halted the day the European war was declared.

No such drastic possibility seems likely at any early point in this country, primarily because the rate of either demand or ability to produce armaments here has not yet reached a stage where it requires all of the materials or labor that is now going into the automotive industry.

There will, however, be further curtailment of production of all consumer durable goods, and this development in industry will materially alter both the requirements of industry for equipment and tools, as well as materials.

The new Supply Priorities and Allocations Board, or SPAB as it is generally referred to, is in much the same position as the old War Industries Board of the first World War days. Donald Nelson holds a similar position to that held by Barnard Baruch, key man in the World War Number One defense effort. The main difference between the Baruch status and that of Nelson is that Baruch had broader powers delegated to him. It appears that Nelson will be given



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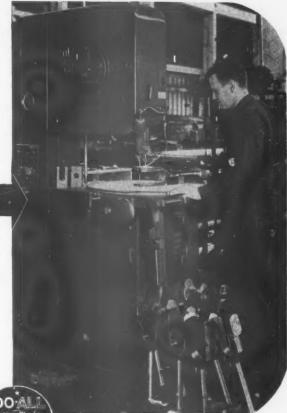
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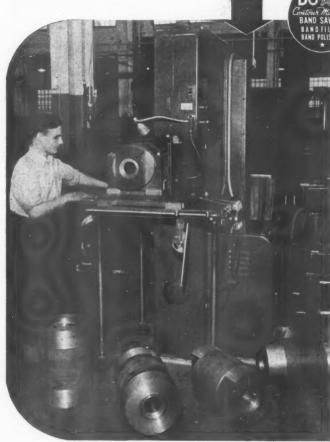
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greater powers if he requires them for administration of the defense effort.

The next month or two will show whether Nelson is a sufficiently competent administrator to direct the nation's defense effort. If his approach is efficient, he will be given further power. If, however, his plans do not speed production of armaments, changes will be made, probably bringing a new figure in the administrative limelight.

As Director of Priorities, replacing Edward R. Stettinius, Jr., Nelson has expedited "paper work" in priorities. One of his first moves was to speed up action on simple routine matters, and through the elimination of bottlenecks in the all-important series of maintenance and repair orders, he has been able to materially reduce the pinch on the nation's industry.

Nelson's Approach

The method he took to cut this red tape is indicative of Nelson's approach. Under the original maintenance and repair order, applicants for priorities ratings were required to make application and received ratings from the Priorities Division when their applications were approved. Obviously, maintenance and repair is not a matter that can be stalled through

administrative red tape.

The original order calling for maintenance and repair ratings and requiring the Priorities Division's approval on each application, bogged down within a few days after the original order was issued. The plan was suspended, and a new plan was evolved through which an applicant for a maintenance and repair rating merely filed the applications with the Priorities Division and immediately served the rating on his suppliers without waiting for formal OPM action.

Another example of the Nelson technique is the revision of procedure on PD-1 application forms, which under former procedure were approved by the issuance of a rating in the form known as PD-2. As the PD-1 form is one of the most widely used, the execution of PD-2's became a large function within the Priorities Division. Nelson merely substituted a rubber stamp by which the rating granted on a PD-1 application could be stamped on the application itself, thus eliminating a great portion of the paper work.

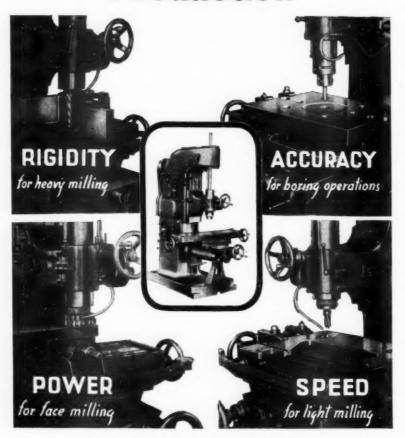
In the reorganization that led to the creation of SPAB and the appointment of Donald Nelson as Priorities Director, the Division of Production was also changed, with W. H. Harrison becoming its director. The tools branch of OPM is under this section.

John Biggers, formerly head of Production, was transferred to London, and his division was split up into the Division of Production and the Division of Materials. Harrison was in charge of construction under the old Biggers setup, and W. L. Batt was in charge of raw materials.

Under the SPAB reorganization, Batt was made director of the Division of Materials, and this division was given jurisdiction over the following branches—the aluminum and magnesium branch, chemical branch, iron and steel branch, power branch, nickel branch, tungsten branch, copper and zinc branch, manganese and chromium branch, tin and lead branch, mica and graphite branch, and miscellaneous minerals branch.

The reorganization left the tool industry under the jurisdiction of the two divisions, with the Division of Materials in charge of all raw materials essential to tools and the Division of Production assuming the pri-

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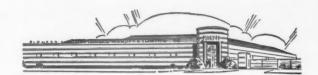


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19645 JOHN R. STREET DETROIT, MICH. mary responsibility for the production of tools.

Most recent of the defense developments indicates that one of the greatest shortages will be in nickel alloy steels. When the defense effort was in the so-called tooling-up stage, there did not appear a heavy volume demand on such metals as copper, but with the manufacture of shells and munitions of all types requiring brass, the advancement into the production stage is bringing on a shortage of cop-

per which is one of the most serious in the metals field.

Consumer Industry Frozen

Expansion of industry has been practically frozen, with the exception of defense industry. In a recent decision, by SPAB, a manufacturer of plastics was denied priorities aid for the construction of a new plant.

Although construction of this plant would have provided plastics said to be capable of replacing 8,000,000 pounds of aluminum, 18,000,000 pounds of chrome nickel plated steel, 6,000,000 pounds of stainless steel and 34,000,000 pounds of zinc, the board held that its immediate construction was not advisable.

One of the reasons advanced for the inadvisability of immediate construction was to the effect that the building of the plant would have required the use of large amounts of various critical materials, including stainless steel. This, it was said, was inadvisable in view of "an expected early winter increase in the demand for nickel for armor plate and ordnance items".

At the same time, SPAB indicated that the production of scarce metals should be encouraged by the expansion of producing facilities. The expansion of production of magnesium, aluminum and copper was requested by the new defense board. In calling for the expansion of production of critical materials, SPAB made the following announcement:

"Expanded production of every critical material to meet the needs of the all-out defense program is called for in a policy announced by the Supply Priorities and Allocations Board.

"The Executive Director was instructed to leave no stone unturned by any agency of Government in the drive to bring production of the nation's basic materials up to maximum defense and essential civilian needs.

"Immediate efforts under the SPAB program will be concentrated on aluminum, magnesium and copper. In each case, SPAB directed that expansion of capacity already planned but not yet actually set in motion be completed as soon as possible."

In the case of magnesium, existing plans call for expansion of production by about 364,000,000 pounds per year. In aluminum, plans call for increased production amounting to 600,000,000 pounds a year, and in this case, the board stated, negotiations for building of new capacity are progressing well.

"Expansion of copper production," the order said further, was called for through a broad campaign designed both to increase the available supply and to reduce the demand for the metal. SPAB estimated that between 250 and 350,000 tons could be saved annually by cutting down on unneces-

(Continued on page 132)

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Now that sort of growth, brought about by the sudden heavy demands of National Defense, has naturally meant that we've had to inconvenience and disappoint some of our good friends and customers in matters of delivery. To say that we are sorry is true—but it does not deliver the needed tools.

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graphed, this Model AA Cleveland was producing parts for the tricycle landing gear of the ship. For more par-ticulars about Cleveland Automatics, write us.

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THE TOOL ENGINEER

Handy Andy Says



AD a very interesting letter from L. C. Tingley, Prex of Federal Products Corp., Providence, to which, anent a bit of fun in the September issue, he added the postscript: "Thanks for the dirty crack about little Rhody". And thanks for the hot tip L. C. I've long wondered if anybody but the censors (drat 'em) and Irwin Holland (who has to, being Ed. Ch'man) reads the column, but now I've found a way to check up. Just hand the readers a dirty crack about their native bailiwicks and right away they're in my hair (?). Which, apropos of nothing in particular, makes me wonder if I won't be wearing a toupee too, one of these days. Ehrsatz, you know.

But getting back to insults now, as between friends. There's Texas, for instance. It seems that when the world was created no provision had been made for Lucifer, so, when that dusty angel joined the U.N.O.* and staged a sitdown, he was consigned to Texas as punishment. But, finding working conditions intolerable, he immediately filed strike notice with the antediluvian N.L.R.B. which, naturally, ruled against the Front Office and ordered a nice, air conditioned Hell to be built. But then, you can't insult the Texans thataway. They brag about the heat, and the bugs, the way Dwight Jones brags about the California climate, and the Chambers of Commerce tell us what a h-l of a state it is just to attract tourists and Tool Engineers. But call one of 'em Harold Ickes and right away he gets mad, especially if he's struck a gusher and can't ship a/c Ickes' afraid the rumble of tank cars will drown out his voice. That's that, and oil's well. Now shoot!

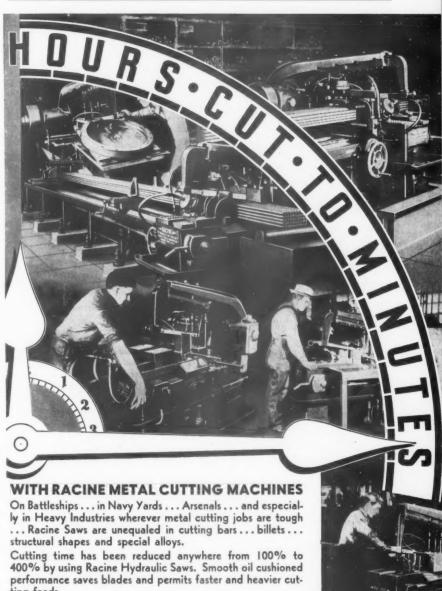
We've been having weather up Nawth, too, of late. My uncle up in Minnesota, whom you met last year, writes me that a cyclone scrambled up his farm plenty. And over yander in New York they had a howler that made B'way look like the Trinity River in flood. Anyway, returning home from vacation via long detours I found the cawn and gladioli celebrating the Ramidan; all prone and heads toward Mecca. But, it's an ill wind, etc. On the other side of town the ladies became mysteriously rejuvenated, staid matrons yoo-hooing to high school boys "The censors again!

OCTOBER, 1941

with convertibles in their sudden (re) adolescence. The wind, it seems, had lifted their faces. No, I didn't see it myself, but Bert Carpenter, who lives out that way, swears it's gospel truth almost.

From one thing to another, the wind blew Connie Hersam into town the other day, along with a blood relation from the Dakotas. She was too good looking to have come from Philly. (Ought to hear from that). Anyway, perennial Treas. Frank Crone and Yrs. Truly spent a very pleasant evening with the buoyant past Nat'l Secy., who was as enthusiastic as ever and had a good word for everybody, the three of us included. Frank took his praises as calmly as he reads his reports at the meetings, but, not being used to anything but panning, I put down an extra Scotch in my excitement. When I got home the wife sniffed suspiciously and wanted to know if I'd been out with King Cole's gang from Chicago again.

But seriously, the pleasure of the evening was considerably restrained because of the illness of Ford Lamb, fighting it out at Henry Ford Hospital. But then, Ford has always been a good fighter, a dynamic force in the promotion of the Society. It has been said that: "He who gives his life shall have it", and certainly, having devoted the best years of his maturity to projecting the A.S.T.E. into engineering leader-



ting feeds.

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ship, Ford Lamb will remain entrenched in our hearts. Since we know not what the morrow may bring, the rest-and the best-may better be left unsaid at the moment.

There should be quite a gang treking Torontoward for the Semi-Annual, especially so since Yank Tool Engineers will be extra-privileged characters, the Canadian government to permit inspection of ordnance plants going full blast on production of arms for Britain. Arnold Thompson, now one of the Who's Who in Industrial Tool Engineering Consulting, is Ch'man of the Program Committee and I imagine that he has planned things we'll long remember. You know, try as I will, I can't think up any dirty cracks about the Canucks, which may be as well under the circumstances. Detroit's too close to the border. But, there was the Norwegian who, touring cross country to Woonsocket and meandering up and down over the international line, commented about the roads as follows: "Ay tell yu, Mr. Lincoln was a fine invineer, but that Frenchman De Tour he wasn't so hot". (Ce'st la guerre.).

Funny how they put the old timers to work, even when they're begging to sit on the sidelines. There's Geo. Keller, f'rinstance, who wants peace and quiet to develop his nut cracker after years of Buffalo Chapter activity-and they go and make him a Director! At that, George will fit in well on the new Board, as fine a looking bunch of men as I've seen since Jim Weaver and I were on the Directorate together. Them were the days, eh, Jim?) Well, joking aside, the new as the old know their tools and their way around, the most having come the hard way to a goal. Carry on! No doubt Ed Dickett, El Rutzen and Connie Hersam will be at Toronto with the rest, Connie having said he might not attend which means that you can't keep him away. And Clyde Hause, of course, who's been so busy spending his spare time at Headquarters of late that I haven't been able to get in touch with him for a month. Hello, Clyde!-if you see this.

Everybody, it seems, is getting air minded these days, which bodes well for the future of the aircraft industry after Hitler has come to see the error of his ways. Louis Biehler, formerly Ch'man of Los Angeles Chapter, has forsaken California's sunny clime for Chicago, where he is busy in the Pullman Company's Aircraft Division. And Frank Curtis is flying hither and yon, and getting things done. Give a job to a busy man, you know. Speaking of airplanes, I'll bet that if Hitler could see what American industry is preparing for his special benefit the Bad Boy of Berlin would wish he'd stuck to paper hanging. At that, the guy is plenty worried, despite that the Nazis have had pretty much their own way prior to muscleing in on Joe Stalin. For, Germany is practically at the zenith of productive resources right now, with the further problem of policing the recalcitrant occupied lands, while we are just getting under way with unity growing as America begins to concede the inevitableness of war. At that, the "final battle" will doubtless be fought on the economic front, and that's where the U.S.A. masses the heavier artillery. But, we'll not talk about that now. We've had our bit of fun and now look pleasantly forward to meeting - in Toronto! Yanks are coming!

Handily Yours



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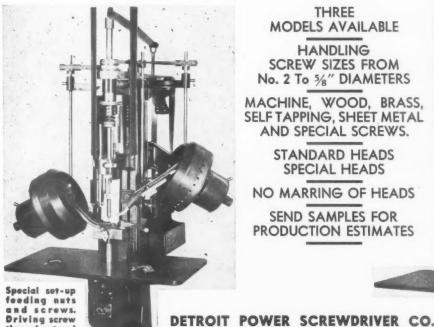
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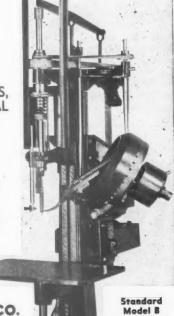
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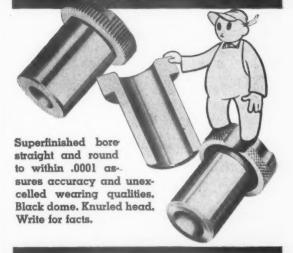
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New Literature

Of Interest to the Tool Engineer

(273) Machinery Machinery and Tools. 640 pp. Catalog No. 142, Brown & Sharpe Mfg. Co., Providence, Rhode Island. This new catalog lists the complete line of machine tools and equipment, as well as machinists' tools, cutters, arbors, and adapters, screw machine tools, magnetic chucks, pumps, etc.

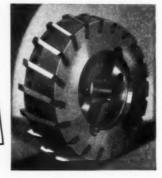
(274) Arc Welding

Handbook of Welding Electrodes. 20 Hobart Brothers Company, Box TE 91, Troy, Ohio. This is the revised edition of the handbook on welding electrodes and accessories.

(275) Lifting

C-F Sheet Lifter. Cullen-Friestedt

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Above: JACK-LOCK Face Mill and Shell End Mill.

Bulletin 15-M shows and lists JACK-LOCK Cutters with high speed, Stellite-J, and Carbide blades . . . Ask for a copy.

Co., 1318 South Kilbourn, Chicago. This booklet describes modern machines for lifting and carrying sheet steel and other hard to handle material where loads from 2 to 60 tons must be moved with maximum safety to men and ma-

(276) Lathes

South Bend Precision Lathes. 8 pp. South Bend Lathe Works, 924 E. Madison Street, South Bend, Indiana. This condensed catalog intended for standard letter file contains a brief description of the entire line of South Bend Lathes. The condensed data includes illustrations, basic dimensions, capacities, speeds and feeds of back-geared. screw cutting lathes.

(277) Alloy Tools
Superior Blades for Inserted Tooth Milling Cutters. 6 pp. All-Purpose Tools with Full Width Blanks. 4 pp. Vascoloy - Ramet Corporation, North Chicago, Illinois. These two bulletins describe the Tantung Grade G alloy containing tantalum carbide developed for borderline machining application between the ranges of high-speed steel and cemented carbides.

(278) Cutting Tools

Metal Cutting Tools. 192 pp. Midwest Tool and Manufacturing Co., 2360 West Jefferson Avenue, Detroit. This catalog contains information on metal cutting tools and holders, including counterbores, countersinks, drills, end mills of all kinds, form tools, keyway cutters, milling cutters, reamers, spot facers and spot facer bars, adjustable extension holders, floating holders, and cemented carbide tipped tools in every type, design and variety. Tables of feeds and speeds, cutter-sharpening data, conversion tables and other useful information are also included.

HOW TO ORDER

Booklets listed in this department and identified by a key number preceding the heading may be obtained by using the postcard on page 101. No postage is required.

(279) Low Cost Machines

New Wings for Production. 16 pp. Delta Mfg. Co., 609-K E. Vienna Ave.. Milwaukee. Numerous photographs of actual air plant set-ups show how these plants are meeting their tooling-up problem. In particular, emphasis is laid on the adaptation of the new type lowcost precision machines-drill presses, cut-off machines, metal-cutting band saws and circular saws.

(280) Cutting Oils

Stuart Oils. 48 pp. D. A. Stuart Oil Company, Chicago. This comprehensive handbook discusses the subject of

McCrosky Tool Corporation Meadville, Pa.

McCROSKY JACK-LOCK Inserted-Blade MILLING CUTTERS



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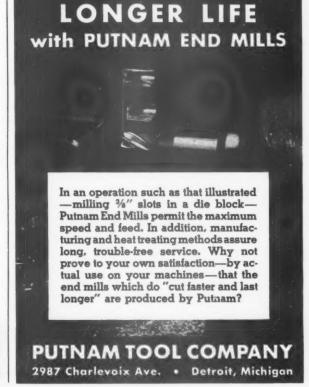
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metal cutting lubricants and recommends the solution to many tough application problems.

(281) Grinding
The Art and Science of Grinding. 48 pp. The Sterling Grinding Wheel Company, Tiffin, Ohio. This folder gives a description of Sterling Wheels together with tables of data helpful to users of grinding wheels.

(282) Drills

Drills-Reamers. 170 pp. Whitman & Barnes, Detroit. This new catalog No.

97 illustrates and lists all types of drills, reamers, counterbores, screw extractors, interchangeable punches, etc. It includes information pertaining to the design, construction, use and care of drills and reamers.

(283) Gear Checking
Checking Internal Spur and Helical Cears. 4 pp. Fellows Gear Shaper Company, Springfield, Vermont. This material supplements a circular recently published on the Fellows Involute Measuring Machine. This circular gives details and the proper procedure

to follow in checking internal gears.

(284) Hack Saws

Spartan Hack Saws & Band Saws. 40 pp. Spartan Saw Works, Inc., Springfield, Massachusetts. This metal cutting manual and reference catalog contains detailed information not only for the buyer of hack saws and band saws, but for the user and shopman as well.

(285) Bearings
Rhoades Metaline Oilless Bronze Bearings. 16 pp. R. W. Rhoades Metaline Co., Inc., Long Island City, New York. This catalog describes the lubricating properties of metaline, outlines the various types and range of applications for oilless bearings, and presents detailed data for use in preparing specifications.

(286) Hydraulic Drives

Hydraulic Drives. 24 pp. Twin Disc Clutch Co., Racine, Wisconsin. This booklet describes the design, performance, and application of hydraulic clutches, and hydraulic torque converters.

(287) Magnetic Chucks

Neutrol Magnetic Chuck Control. 8 pp. Electro-Matic Products Co., Chicago. Included in this folder is description of a new development in motor controlled units which gives instant traverse between power and residual where it is desired to retain residual magnetism in all of the pieces and yet allow the operator to easily remove one or a number of pieces for gauging purposes.

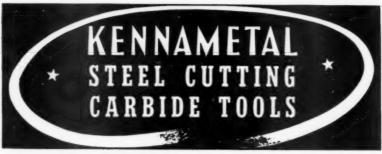
(288) Micrometer

Carson Electronic Micrometer. 4 pp. Instrument Specialties Company, Inc., Little Falls, New Jersey. Because it makes measurements without pressure, the Carson Electronic Micrometer works as well on soft and compressible materials as it does on steel. On such materials as rubber, fabric, cork, felt, fiber, plastics, paint films or paper, it is said to measure thickness accurately to .0001 in.

(289) Coolant Pumps

Coolant Pumps by Warren. 4 pp. Warren Steam Pump Company, Inc. Warren, Massachusetts. This folder gives a general description of the Coolflo pumps, detailed specifications, illustrations, and performance curves.

Use the Convenient **BUSINESS REPLY CARDS** in this issue See Page 101!











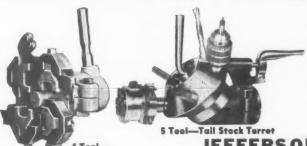
Save thousands of man hours on defense jobs everywhere.

In gun factories, in shipyards, in Government arsenals, in airplane plants . . . virtually everywhere that steel is being machined for National Defense, you will find KENNAMETAL carbide tools on the job. Because of its faster cutting speeds, KENNAMETAL increases the production of both men and machines from 30 to 50% ... saving thousands of man hours urgently needed in the Defense effort.

Despite the tremendous demand for KENNA-METAL, shipments of Standard and Modified Standard tools are made within 10 days of receipt of orders; standard tool tips within 3 to 4 days. Some Standard KENNAMETAL tools (supplied in grade KM only) are now carried in stock for immediate delivery. Write for weekly stock list.



SPEED-UP PRODUCTION-LOWER COSTS



CONVERT ENGINE LATHES

Here's a quick and economical method of converting your engine lathes into complete, accurate turret lathes—by installing the Jeffer-son Tail Stock Turrets, the Jefferson Tool Post Turrets and the Jefferson Adjustable Pull-Feeds.

These sturdy, precision attachments have in many cases made it possible to double productive capacity - because nine different tools are quickly available at all times - independently or collectively.

Any kind of work may be done

quickly and efficiently — forming, roughing, boring, finishing, knurling, drilling, tapping, etc., without stopping lathe or changing

Jefferson Turrets are real production tools—substantial, rigid, accurate and adaptable to any size or make of engine lathes. They must not be confused with the small makeshift gadgets now on the market.

We also manufacture Belt Sanders, Swing Frame Grinders, Gyratory Foundry Riddles and Milling Machines. Let us mail bulletins giving full details.

JEFFERSON MACHINE TOOL CO. Sweeney, Cutter and Fourth Sts. Cincinnati, Ohio



ool Post



IT'S NEW

NEW EQUIPMENT- NEW MATERIALS - NEW PROCESSES

(F37)



(F36) Eight 'standard' tools at a time—having their top and side angles as well as clearances ground automatically on each spindle of a new 3-spindle grinder. The machine was developed at Carboley Co., Inc., to enable it to speed carbide tool production. This grinder is capable of turning out as many as 1200 Carboley 'standard' 1/2 inch square tools every 24 hours.

OSTER TURRET LATHE

Designed with hand feed to cross slide and manually operated, this low cost motor driven lathe, known as the Oster No. 601 Turret Lathe, is furnished with a six position turret having six 11/2" diameter tapped holes in each turret face for mounting various sizes of tool holders. It is offered by the Oster Mfg. Co., 2063 East 61st Place, Cleveland. If the hexagon turret is not required, the machine is furnished with a plain saddle on which a variety of tool posts or other fixtures can be mounted. New operators can be trained to efficiency more rapidly than on more complicated machines, it is claimed.

Among the many operations performed by the machine are boring, reaming, threading, facing, and cutting off. Less skilled operators are required as many complicated features of design and operation have been eliminated. Automatic chuck capacity is 1½" round bar; 1-1/16" square bar; and 1-5/16" hexagonal bar. Swing over bed is 14" and 6½" swing over cross slide. Carriage travel is 11" when there is a cross

slide on the 33" main ways. Maximum movement of screw feed across slide is $6\frac{1}{2}$ " and of lever feed cross slide $4\frac{1}{2}$ ".

The machine is furnished with either worm drive or direct drive depending upon the required range of spindle speed. In the worm drive, the hardened and ground steel worm, like the spindle, is mounted in ball bearings, transmitting a smooth, even flow of power through a bronze worm wheel to the spindle. Due to this smooth flow of power, the machine can make unusually heavy forming cuts with absence of chatter, it is claimed by the manufacturer. In the direct drive, for high speed work on small diameters and non-ferrous metals, the No. 601 machine is equipped with a two-speed, 2 hp motor, manually controlled, driving the spindle through triple V belts. Quick change sheaves and the two-speed motor provide a range of spindle speeds up to 3000 rpm. This machine with its wide range of applications, ease of operation, relatively low cost, and availability on comparatively short delivery schedules is claimed by the manufacturer to be making a definite contribution to the National Defense Program.

ENTERPRISE EMPCO UNIT

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The Model E Empco Unit, offered by the Enterprise Machine Parts Corporation, Detroit, is said to incorporate many new features to increase the adaptability and capacity of these tools. Oil seals have been provided at every opening to prevent the entrance of dirt and permit the entire operating mechanism to work in a bath of oil. The spindle quill and return cylinder rod have been hardened, thus providing two hardened, replaceable surfaces to control the reciprocating movements of the tool. The plate or snail type cam is retained since with metal band saws generally available, any cam can be quickly and economically produced in changing from job to job. Blank cams are carried in stock. A screw adjusting type sub-base is provided to give micrometer adjustment to the outward position of the tool.

The front face of the Unit is keyed and tapped to accept lead screw brackets for the tapping, drill guide bushing



Oster Turret Lathe
Wide range of application and comparatively quick delivery.

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THUS AIDING NATIONAL DEFENSE!

HIGH SPEED STEEL gets scarcer by the minute! Every pound you can release conserves that much more of the Nation's supply also saves you money.

Instead of using solid cutters, change to the O K tools shown above. In these only the cutting edges, or blades, are of high speed steel. The bodies (which do no cutting) are drop-forged chrome nickel steel, heat treated for strength. The high speed steel thus saved often runs as

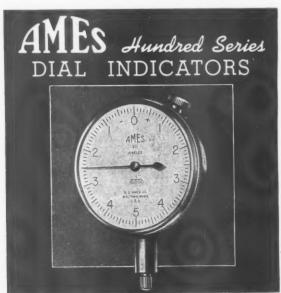
high as 60% to 70%, and you get better, more flexible tools.

In O K milling cutters, end mills, face mills, boring heads and counterborers, the blades are securely locked in mating serrations, yet may be quickly advanced in line of wear. Such tools do not "shrink" from repeated grinds. A wide range of blade shapes as well as special grinds are available.

TOOL SYSTEM

The O K Inserted-Blade principle is also to be had in single point tools for lathes, shapers, planers, etc. May we send you descriptive literature?

Manufactured only by the OK Tool Company, Shelton, Conn., U.S.A.



Made to A. G. D. specifications in four sizes with fourteen different dial numberings indicating thousandths, half and tenths of thousandths inches. Plain or jewel bearings. Shock absorbers for all models. Send for new catalog No. 52

B. C. AMES CO., WALTHAM, MASS.

MOREY"27" SEMI-AUTOMATIC HEAVY DUTY LATHE



Just the Machine for Shell Work!

Suitable for rough or finished turning shells at maximum feed.

Put your shell operations on this fast powerful lathe and turn out your work at top speed up to the limit of tool capacity.

Multiple tool holders can be supplied at front and rear; a turret mounted on separate saddle can be used instead of tailstock.

Full use of carbide tools can be taken by this heavy duty lathe.

Ask for Circular No. 715

MOREY MACHINERY CO., INC. 410 Broome Street New York, N.Y. supports, and the outboard spindle bearings. The planed top surface of the Unit will accept all overarm supports as used when milling. A machine pad on the side permits attaching interlocking devices or index table drives. A large flange accurately drilled has been provided to accept multiple spindle heads or milling attachments. The spindle may rotate in either direction. Special or standard milling attachments may be had for any size Unit. Lead screw controlled tapping is provided with reversing motor drive. A geared transmission may be provided to give a

total of four spindle speeds. Planetary type thread milling or similar work can be handled.

SOUTH BEND (F39) TURRET LATHE

A new 16" swing turret lathe designed for rapid production on chucking operations and bar work has been announced by the South Bend Lathe Works, 924 East Madison Street, South Bend, Indiana. This lathe has a 1614", swing over the bed ways and saddle wings, 95%" swing over the tool post

saddle cross slide, 13%" hole through the headstock spindle and 1" capacity through the collet. The ram type turret has both power feed and hand feed, with automatic indexing and individual stop for each of the six turret faces. A quick change gear box provides 48 changes of turret power feed, also 48 changes of both the cross and longitudinal feeds for the tool post carriage and a series of 48 screw threads, 4 to 224 per inch. Provision is made for changing the direction and speed of the turret feeds with relation to the carriage feeds. Twelve spindle speeds ranging from 10



South Bend Turret Lathe

to 731 rpm are available. A two-speed motor permits quick change from high to low speed for reaming and tapping operations.

BARNESDRIL (F40) HONING MACHINE

The demand for a small size horizontal honer has led to the design of the No. 1 Horizontal Hydraulic Honing Machine by the Barnes Drill Co., Rockford, Illinois. This machine has a capacity for honing long bores up to $1\frac{1}{2}$ " diameter in lengths up to a maximum of 12 feet. The design of this No. 1 size with hydraulic cylinder and piston for reciprocating the carriage is said to produce a very smooth, perfectly true finish on the internal cylindrical walls of rifle bores,



Barnesdril Honing Machine

tubes, cylinders, and other long work within the capacity of the machine.

The reciprocating action of the carriage carrying the spindle for driving the honing tool must be very smooth and with a quick, shockless change of direction at the end of the stroke and

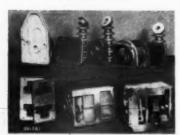
Stakes the best to make the best!

THAT'S WHY LEADING MACHINE TOOL BUILDERS SPECIFY BLANCHARD SURFACE GRINDERS

YOU will find Blanchard Surface Grinders in all the leading machine tool shops. The reason? - It takes quality machine tools to reproduce quality in other machine tools. We illustrate a typical example of a Blanchard used on this type of work. 1/4" of stock is ground off two surfaces of the cast iron gear boxes, shown here, at a production of 15 pieces (30 surfaces) per hour. These boxes are 12"x 12"x 18". A Blanchard No. 18 Grinder with 36" chuck and a column extended to take 18" work is used, together with a Blanchard Sectored Wheel, manufactured by the Blanchard Machine Co. But that's only half the story. Formerly these gear boxes required hand scraping to obtain oiltight joints - now they are ground on a Blanchard so that scraping is eliminated! In times like these, no one knows better the value of speed and quality than the machine tool industry. That's why old Blanchard customers are still Blanchard customers.



No. 18 Blanchard Grinder



Group of parts ground on Blanchard Grinder shown above



THE BLANCHARD MACHINE CO. 44 STATE STREET, CAMBRIDGE, MASS.



Corromatrix Chuck Jaw



Cerrobase Reproduction



Tube Bends Made w

Perferating Die with Punches Secured by CERROMATRIX

CERRO ALLOYS have helped many progressive metal-working plants keep abreast of Defense demands. These non-shrinking, low-temperature-melting alloys are furnished in any analysis required. The three most widely used are described below:

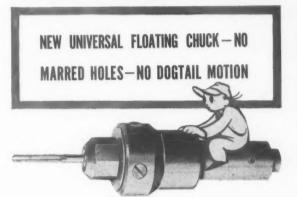
CERROMATRIX—for securing punch and die parts, making chucks for holding irregular parts, anchoring machine parts, many other uses.

CERROBASE—for reproducing master patterns, models for electroforming, proof casting for forging dies, etc.

CERROBEND—used as filler in bending thin-walled tubes to small radii—easily removed in boiling water.

Send for literature, mentioning operation in which interested.





Operates horizontally in automatic screw machine or turret lathe. Adjustable spring pressure in 4 directions counterbalances weight of tool and prevents marred or bell mouthed holes. Useful in any operation where piloting from the lead hole is required. Write for catalog.

UNIVERSAL ENGINEERING CO.



CAMPBELL #213
ABRASIVE CUTTING MACHINE

REDUCES COST OF CUTTING 90%!

★ Close tolerances were required in ¾" spacers cut from 2¼" x 1¼" silicon manganese bar stock.

Former milling machine operation required annealing prior to cutting—cutting and finishing requiring 20 minutes per piece. CAMPBELL No. 213 ABRASIVE CUTTING MACHINE reduced the time per finished piece to 28 seconds—and ended the need for annealing.

If you are cutting metal with any other equipment, it may pay you, too, to ask a Campbell man to study your operations.

WORK BEING CUT ON CAMPBELL NIBBLERS

Sheet stocks, tubing, gas and oil tanks for Aircraft—motor truck bodies, armored truck bodies, etc. for the Army. DEFENSE WORK CUT ON CAMPBELL ABRASIVE CUTTING MACHINES

Aircraft: Crankshafts, valve stock, valve tappet guide, pistons. Tanks: Crankshafts, springs. Miscellaneous: Gun barrel and machine gun stocks; armor plate (tests), forging blanks.



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BOOKLET

WEST

ANDREW C. CAMPBELL DIVISION
BRIDGEPORT, CONNECTICUT

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.

with no dwell. However, for blind end honing, the machine can be provided with a special control feature so that the spindle will hesitate slightly at the blind end for removal of all of the stock, but no more.

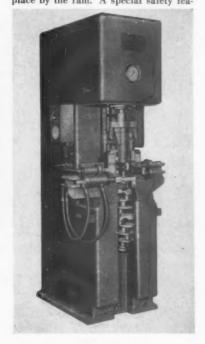
The main bed comprises a fabricated elongated frame which is provided with horizontally disposed hardened bar ways upon which the spindle head or carriage is movably supported. The reciprocating control is an electrically operated hydraulic system. This also provides for adjustable stroke stops for

any length of spindle travel from 2' up to full limit of travel. Stops may be set for working stroke so that the exact amount of overrun is provided at each open end of the bore. This control also provides means for entering the hone into and for withdrawal from the work without rotations.

DENISON (F41) CRANKSHAFT PRESS

A Denison Hydroilic Press for assembling keys and timing gear on automobile crank shafts was recently built and supplied to one of the automobile manufacturers by the Denison Engineering Co., Columbus, Ohio. The press is a special modification, or adaptation, of one of the manufacturer's standard line of small-capacity hydraulic presses which were recently developed and designed suitable for modifying to meet a wide variety of special production pressing requirements.

This particular press is of 5-ton capacity and is entirely automatic. The crankshaft is locked in place and the keys fed into the press through magazines. Four cylinders assemble the two keys and the timing gear is pressed into place by the ram. A special safety fea-



Denison Crankshaft Press

ture halts the operation of the ram if the keys are not pressed into place properly. The equipment is also arranged so that if the timing gear does not fit, the pieces are rejected.

RED RING (F42) HAND PROFILER

The new Red Ring Hand Profiler just completed by the National Broach & Machine Company, Detroit is said to be meeting an urgent defense need, especially in production of intricate mechanical parts such as those incorporated in the breech mechanism of small arms and machine guns, also for certain aircraft parts and bearings.

It operates on the principle of duplicating in the work part the profile of a master pattern by properly guiding an



★ Changing over to DBL High Speed Steel is just about the finest protection any user of cutting tools can get.

DBL complies with OPM orders, protects you against tungsten shortage and aids the nation's conservation program for defense, because it contains less than one-third as much tungsten as "18-4-1" High Speed Steel.

It protects you against loss of production, because in 85-90% of

all cases, it performs just as well and frequently better than 18-4-1. And it protects you against buying any new equipment or learning new techniques, because it heat-treats in exactly the same equipment and by the same methods as 18-4-1.

Solve your High Speed Steel problems, once and for all, by changing over to DBL. All you need is the DBL "Blue Sheet," which contains full technical data. Mail the coupon below for your copy.

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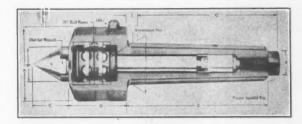
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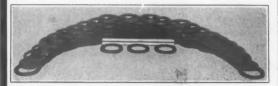


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Acme has the knowledge and facilities to provide surfaces as flat as you need them.

May we confer with you on your sealing problem?

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WOODY SPENCER SAYS:
"The right play at the right time accomplished the 'Impossible'."

In 1935, at Columbus, undefeated Ohio State led Notre Dame 13-12. It was Notre Dame's ball near Ohio's 30 yard line, second and ten, with 60 seconds of play remaining. Then—signals, shift—and Bill Shakespeare let fly a bullet-like pass which Wayne Millner nabbed in the shadow of Ohio's goal posts for the scoring play that followed. The right play at the right time had turned defeat into victory in 20 seconds.

The right play at the right time gains yardage. Similarly, the right tap at the right time means greater production. We can assist you in selecting the taps best suited to your requirements through our engineering service. It is at your disposal. Write us today . . . our engineer nearest you will call . . . there will be no obligation. The Wood & Spencer Co., 1918 E. 61st St., Cleveland, Ohio.

"The Right Tap at the Right Time"



end mill, using the master pattern as a guide. The head carries two cutter spindles 10" on centers, which can be used simultaneously. In order for the cutter to trace the path of an irregular curve, movement must be provided in two directions in the horizontal plane. The head carrying the cutter spindles moves toward and away from the operator with a head travel of 4" in each direction. The table which carries the work and has capacity for two work fixtures moves laterally at right angles with the path of head movement, with a maximum travel of 10" each way. Total

area covered by the cutter is 160 square inches. Both slides are equipped with adjustable stops to limit travel in either direction.

Both head and table movement in horizontal planes is accomplished by manipulating hand wheels conveniently located at the front of the machine, one wheel for each slide. Wheel rotation is transmitted to these moving elements through helical gears and racks. Although the construction of this machine is massive to eliminate vibration, both head and table respond instantly to finger-tip pressure on the hand wheels.

This smoothness of movements facilitates constant bearing of the guide pin on the contour of the master pattern, provides the significant feel of cutter feed and assures accuracy of cutter travel. It is accomplished by carefully distributing and balancing the weight, and by mounting all slides on large diameter precision roller bearings, which operate against tracks that are hardened and accurately ground.

LAKE ERIE (F43) STRAIGHTENING PRESS

A new line of heavy duty hydraulic straightening presses is announced by the Lake Erie Engineering Corporation of Buffalo, New York. Special features are C-frame for convenient handling of long bars, fast operation with sensitive control of pressure and stroke.

The bed is fitted with V blocks adjustable to suit work. Spring rollers at



Lake Erie Straightening Press

ends facilitate movement of bars. Control is by means of a conveniently located hand lever, operation of which determines desired pressure. Pumping unit is located at bottom and back of press.

NIAGARA (F44) POWER SQUARING SHEARS

A new line of shears has been announced by Niagara Machine & Tool Works, Buffalo, New York. Accuracy heretofore unattainable is claimed by these new shears. Sheared edges can



High Speed Cutting-off in the stockroom ends delays and profitless handling

In modern plants everywhere, just as in this large electrical manufacturing plant, it has become part of efficient plant operation to install one or more MARVEL No. 6A or No. 9A High Speed Production Saws right at the stock racks, to end material "bottle necks" and unnecessary materials handling.

With one of these versatile heavy-duty all ball-bearing saws, (the fastest cutting-off machines built) the stockroom can provide single pieces or quantities of identical pieces, cut-off from bars and tubing on a moment's notice. With no more operator attention than is required by an automatic screw machine, these Saws will automatically measure, feed and cut-off identical lengths, slices or pieces from single or nested bars. Quantity runs can be interrupted at any point for a miscellaneous cut by simply disengaging the automatic bar push-up.

Buy from your local distributor

ARMSTRONG-BLUM MFG. CO. "The Hack Saw People" 3700 Bloomingdale Ave., Chicago, U.S.A. Eastern Sales: 225 Lafayette St., N. Y

"TIME IS SHORT" in Every Tool Room

.... and Machine Tools that help save time in the tool room, speed the work all along the production system.

Boyar-Schultz Profile Grinders shorten the time required for grinding irregular contours and odd shaped surfaces in dies, punches, templates, cams and similar work.

The Floor Model No. 2, shown at right, is an ideal tool for heavy, complicated work. It is equipped with two independent oscillating spindles driven at 10,000 R.P.M. It is a machine that has demonstrated its worth in both tool room and production.



BOYAR - SCHULTZ
PROFILE GRINDER Na. 1
A Bench Model for grinding
and fitting dies and
punches, grinding die clearances and similar time consuming jobs. High speed of
20,000 R. P. M. with vertical
oscillations of 100 per minute assures efficient grinding, even with small diameter wheels.

WRITE FOR CIRCULARS





Upper Spindle Grinding Inside Contours



Upper Spindle Grinding Angles on Curved Surface.



Lower Spindle Grinding

BOYAR-SCHULTZ CORPORATION, 2116 Walnut St., Chicago, III.



DE-STA-CO ARBOR SPACERS

They save time in setting up cutters on milling machines and other tools. Will help you get work out quicker. Low in cost, but high in savings. Standard stock sizes from .001" to .125" thick. Also specials up to 4.000".

TRIAL ASSORTMENT

Enough spacers for average use on one machine, sent for \$1.00. Give arbor size when ordering.

Price list No. 70 sent free

DETROIT STAMPING CO

356 Midland Ave . Detroit, Mich.

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achograph

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NEW JUNIOR MODEL

Buy the Original Electric Etcher

Three sizes to meet all requirements. Also a combined Etchograph and Demagnetizer.

With New ELKONITE TIP Pencil

Mark hardened parts tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainty.

Write for circulars and prices.

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NEW YORK, N. Y.

U. S. A.

reliably be cut that are straight to within a very few thousandths of an inch of a straight line, without any special skill of the operator, it is said. Narrow strips, accurate to gage setting and parallel within close limits, are easily produced without camber or curl.

Higher production is made possible because of the higher operating speed, the instant engagement of the Niagara sleeve clutch, the quick release of the holddown, and the convenient arrangement of features for the operators, it is said. Strips may be cut at the rate of 75 per minute on 60 cycle current.



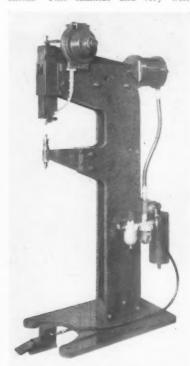
Niagara Power Squaring Shear

The drive including the flywheel, gearing, clutch, eccentrics, and connections are wholly enclosed within the machine and operate in a bath of oil. A new detent device is featured which completely replaces the customary friction brake and requires no adjustment or attention.

TOMKINS-JOHNSON RIVET SETTER

A new type of production rivet setting machine for use in the aircraft industry has been developed by the Tomkins-Johnson Co., 624 North Mechanic Street, Jackson, Michigan. On this new Rivetor, pressure for setting the rivets is furnished by an air cylinder. The air pressure from this cylinder is applied (and stepped up) through a toggle mechanism. This familiar and very well

(F44)



Tomkins-Johnson Rivet Setter

liked "air squeeze" action is combined on this machine with the automatic feed feature which has before this been seen largely only on electrically powered riveting equipment, it is said.

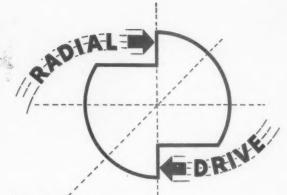
In addition to this, by using a different type of rivet set and rivet jaw construction, these machines can be used for flush riveting. The machine is capable of setting up ¼" diameter x ¾" long aluminum alloy rivets. The machine is equipped with a 6" diameter air cylinder. Recommended air pressure is 60 pounds pressure per square inch.





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The Vinco Dresser provides you with the only fast, accurate method of meeting every forming requirement in dressing operations. It incorporates the basic patented principle of dressing radii, angles and angles tangent to radii on abrasive wheels without moving the diamond. It can be used on your surface, external, cutter and internal grinders. And, in addition to this flexibility, you can count on dressing accuracy to within .0001" and savings of approximately 75% in dressing costs.

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WEST: Stock, Jos. C. Fletcher, 1415 Folsom St., San Francisco, Cal.; Frey Industrial Supply Go., 3828 Santa Fe Ave., Los Angeles, Cal.

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THE PRODUCTO MACHINE CO. BRIDGEFORT, CONN.

and

3017 Medbury Ave., Detroit, Mich.



EX-CELL-O THREAD GRINDER

A new thread grinding machine is now being produced by the Ex-Cell-O Corporation, Detroit. It is known as Style 39A, is for internally threaded work, and is automatic in operation.

(F45)

It grinds threads up to 5" in length with a distance of 15½" from the work spindle nose. Maximum hole ground is 91/2" with a minimum of 1". Maximum swing is 10". Taper attachment is available with this new machine that allows grinding up to a maximum of 4" in diam-



Ex-Cell-O Thread Grinder

Suggestions for chuck users. Published by the Coshman Chuck Company in the interest of better service during the Mational Defeuse ewerdeuch.

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What has a piano got to do with chucks? Well, we saw in the paper the other day that a famous musician had his hands insured for something like a quarter of a million dollars. And we couldn't help thinking about the thousands of strong steel "fingers" in those Cushman chucks that right now are so important to our defense production. We might well consider pretty substantial insurance coverage on them too.

The only kind of insurance, however, that will do any good here, is at once very Mr. Chuck User.

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THE CUSHMAN CHUCK CO. HARTFORD, CONN. eter per foot on the effective thread length.

The 39A is one of eight standard precision thread grinders now bearing the Ex-Cell-O name, these various machines are said to cover an exceptionally wide range in thread grinding work.

(F46)

FRAY MILLING MACHINE

The No. 7B Fray Milling Machine is offered by the Fray Machine Tool Company, 515 W. Windsor Road, Glendale, California. The column, table, knee, and saddle of this machine are of the same material and size as in the No. 7 Standard Milling Machine. The head on the No. 7-B Machine is of the ram type. The movement of the ram being



Fray Milling Machine

controlled by a feed screw operated by means of a ball crank with positive jaw clutch to prevent accidental movement The feed screw is fitted with a 3" dial, calibrated in one-thousandths of an inch so that the milling head can be accurately given an in and out movement above the work. By setting the turret head at any desired angle, it is also possible to perform angular machining operations by means of the ball crank controlling the ram.

STUDEBAKER (F47) HYDRAULIC VISE

A new hydraulic vise, said to offer considerable savings in time and labor, has been introduced by the Studebaker Machine Company, Chicago, Illinois.

Capable of developing pressures up

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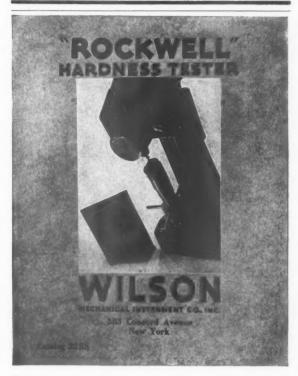
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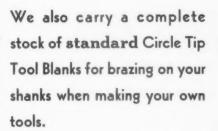
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to 5 tons between the jaws, the new vise is designed to speed up small press and cutting operations, as well as ordinary vise work, and is understood to have wide application on production lines, in tool rooms, and for maintenance. The new Studebaker Hydraulic Vise is operated entirely by foot control, permitting the use of both hands in setting up and removing work. Pressure to close the jaws is controlled by a foot pedal pump arrangement in a pedestal mounted on the floor. The latter is connected with the vise proper by a steel tube which carries the hydraulic fluid to a ram behind the back jaw and thus moves it forward. Front jaw is stationary.

Stepping on one pedal moves the vise jaw to contact against the work. A second pedal applies pressure up to 5 tons. A third pedal releases the jaw. Some of the different types of jobs the new Studebaker Hydraulic Vise can perform are press work, punching, bending, cutting, straightening, testing, and stamping. Because the operator can use both hands, exceptionally heavy work can be easily handled and with a degree of precision heretofore impossible. The vise mounts horizontally on any type of bench as well as vertically on wall or post. Special jaw faces can be applied.

GISHOLT (F48) TURRET LATHE TOOL

A new heavy duty adjustable turning head for turret lathes, has been announced by Gisholt Machine Company, 1229 East Washington Avenue, Madison, Wisconsin. This tool is designed for turning and boring work, accommodating standard cutter holders in one of the two holes on the slide, as well as additional tool holders in the auxil-



Gisholt Turret Lathe Tool

iary slide mounted at the rear. Provision is also made for the mounting of a drill or boring bar, together with a facing cutter. The main slide is quickly adjusted to size by means of a ball crank handle, fitted with a large micrometer dial and observational clips. A long binder lever rigidly locks the tool slide, permitting heavy, accurate cuts. The auxiliary slide is vertically adjustable. An extra large overhead pilot bar, giving support to the tool, can be mounted on the machine or on the tool itself.

SOUTH BEND (F49) SURFACE PLATE

The South Bend Tool & Die Co., 2209 South Main St., South Bend, Indiana offers a 48" x 96" Surface Plate, cast in semi-steel and finished plane within

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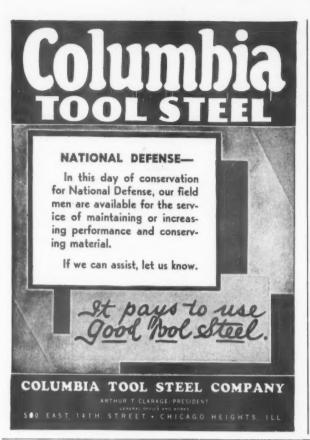
South Bend Tool's Surface Plate

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THE TOOL ENGINEER









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Quickly pays for itself

in Faster Production-Less Tap Breakage

In gruelling tests on actual production work—this remarkable new High-Speed Tapping Head with the exclusive "Tru-Grip" Tap Holder has broken numerous plant records for speed of tapping, accuracy and elimination of tap breakage. There are definite reasons for this: The Tru-Grip Tap Holder is so compact and light (weighs 1/3 of conventional tap holders) that fly wheel effect is

reduced to a minimum. The Tapping Head offers dry, double cone friction clutch that won't wear, can't absorb oil and makes bottom tapping easy—three-point balanced heat-treated gear reversing mechanism that distributes pull and greatly reduces strain—and many other important features. Find out how this tapping head can quickly pay for itself in your shop—and solve your tapping problems!

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.005". This large surface plate offers seven specific support-points for utmost flexibility and usefulness. Two sizes of adjustable blocks or legs provide possible working-surface heights between 29" and 33". The block support threaded 1½" screws, each topped with a circular cap which is recessed to contain any of the projecting support-points on the bottom of the plate. A 12-pitch thread provides fine adjustment to compensate for floor irregularities. Five of these blocks are provided with each surface plate. The ribbed under side of the plate is designed to provide maximum

strength without excessive weight. The surface plate weighs 3 tons.

TIMKEN (F50) LARGEST BEARINGS

Four Timken tapered roller bearings installed on the back-up rolls of the new reversing hot mill of Aluminum Co. of America mill at Alcoa, Tennessee, have 30% more capacity than any bearings ever built before. These bearings have a 35½" bore by 51" outside diameter by 36" width. They weigh 9,070 pounds each and have a mill separating force capacity of 8,300,000 pounds at mill speed.

Each bearing is a four cage assembly with 34 machine turned, case carburized rolls per cage, or a total of 136



Largest Timken Bearings

rolls per bearing. Individual rolls are 4" in diameter, 71/4" long and weigh 23.37 pounds. The cones and cups are forged. The cages are turned.

(F51) HOBART WELDER TRAILER

A new four-wheeled light-weight pneumatic-tired trailer for mounting all Hobart electric drive welders is announced by Hobart Brothers Company, Troy, Ohio. Easy portability makes this new welder doubly useful enabling it to make hurry-up trips to different parts of the plant and yard for emergency production, maintenance and repair

The trailer is designed so that the mounting is easily accomplished by



Hobart Welder Trailer

means of four bolts in the frame of the trailer which register with four holes in the legs of the welding machine. Unit is easily moved by hand by virtue of the low, underslung construction, narrow 27 inch tread and method balancing.

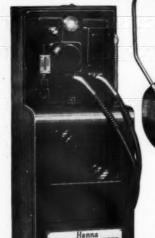
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The fact that rivets can be driven in practically any position permits a reduction in the number of riveters necessary to produce varied assemblies. We will be glad to discuss the application of Hanna Portable Hydraulic Riveters to meet your specific problems.

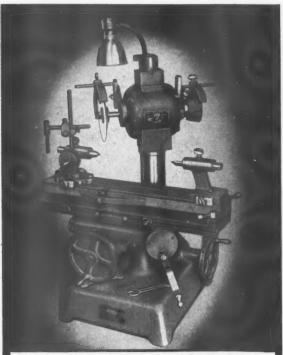
SEND FOR NEW BULLETIN Send for your copy of the new 6-page bulletin which gives details on the new Hanna Portable Hydraulic Riveter.

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» » A. S. T. E. DOINGS « «

By IRWIN F. HOLLAND

Baltimore

Baltimore Chapter opened its fall season on September 3 at the Sears Roebuck Auditorium. Mr. J. D. Trethaway of the Cerro de Pasco Copper Corporation, 40 Wall Street, New York, spoke on the application of Bismuth Alloys for Industrial purposes. He covered quite thoroughly three of the alloys—Cerro Matrix, Cerro Bend, and Cerro Base.

After the lecture, Mr. Trethaway displayed numerous samples of the results of using the Cerro Alloys.

Certainly D. K. Miller, Chapter's Meetings Committee Chairman deserves a lot of credit for being able to procure speakers as interesting as Mr. Trethaway.

It was announced that on Wednesday, October 1, at Sears Roebuck Auditorium, George Stevens of the Rustless Iron & Steel Corporation would talk on Modern Machining Methods applied to stainless steel.

Hearty congratulations are extended to Nils Lou who has been elected to serve as Regional Director of the Baltimore-Philadelphia area for one year. Good Luck Nils. The Baltimore Chapter is proud of you.

Buffalo

Messrs. Frank Curtis, President: O. W. Winter, 1st. Vice President; R. H. Morris, 2nd Vice President; Frank Crone, Treasurer; C. L. Hause, Secretary, and Howard Handyside, Office Manager, Detroit office, pleasantly surprised the members of the Buffalo-Niagara Frontier Chapter by attending their 5th annual picnic which was held at the Buffalo Trap and Field Club, Saturday afternoon and evening, September 6.

The base ball teams, the Nuts and the Bolts, displayed a real Brooklyn-St. Louis fighting spirit, and after both teams were tired out, the Umpire was declared the winner by a neck. There was plenty of beer and food which lasted well into the evening; in fact, Chairman Al Siegel was seen eating more than once.

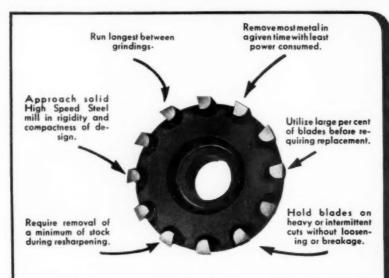
C. Crofoot and his picnic committee, including G. Keller and D. Reep, deserve a big hand for a swell afternoon.

All A.S.T.E. members who are in or near Buffalo Thursday, October 16, are invited to attend the regular monthly dinner and meeting to be held at the University Club, Delaware Ave. Mr. A. T. Colwell of Thompson Products Inc. will be guest speaker of the evening. His topic: Behind the Scenes in National Defense Engineering should be of interest to all members.

Chicago

The first fall meeting of the Chicago Chapter was held on September 8 at the Midwest Athletic Club. Following dinner, a brief business meeting disposed of the summer's accumulations.

The Fall Technical Sessions were opened with a film, "Lockheed for Leadership", showing pictorially a trip through the Lockheed plant. Then Mr. H. E. Linsley of the Wright Aeronautical Corporation provided the hit of the evening—a film of his own taking. This film, which might well have been titled "Pictures of Tools, by a Tool Engineer, for Tool Engineers," showed some very recent developments in the manufacture of the Wright engine.



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LOVEJOY TOOL CO., INC., SPRINGFIELD, VT.



Buffalo Tool Engineers Picnicked, Sept. 6th

Cincinnati

At 6:30 P. M. on the evening of September 9th, a crowd of 285 men assembled in front of the R. K. LeBlond Machine Tool Company. These men were all members of either the A.S.T.E. or A.S.M., who had been graciously invited to a dinner meeting at this plant. Due to the defense work in the plant, all guests had to be identified and carry special pass cards.

Our Host, the R. K. LeBlond Machine Tool Company, then took group pictures of the crowd. Promptly after the pictures were taken we were invited to the Company Lunch room where our host had prepared a very tasty dinner. The members had everything from soup to dessert, including a good portion of grilled steak. After the dinner, there was a welcoming address by R. K. Le-Blond's Mr. Pierle and a very short business meeting headed by the Local Chapter Presidents of A.S.T.E. and A.S.M. The crowd was then broken into small groups, each with a guide furnished by our host, and the plant inspection tour was on its way.

The members saw a large tool plant busily working night and day producing lathes for defense work. Included among these lathes were some large gun boring lathes. The members were shown actual production work being done on the "Flame Hardening" machines, which was especially interesting, since "Flame Hardening" was to be the subject for the evening's talk.

By 9:30 P. M., the crowd was again assembled in the lunch room for a talk by Mr. A. L. Hartley, Metallurgist for the R. K. LeBlond Tool Company.

After the talk an open discussion on the subject was conducted.

The Chapter's next meeting will be a plant inspection of the new Cincinnati plant of the Wright Aeronautical Corporation.

Cleveland

The 1941-42 meeting season opened with a bang-up session on Friday September 12th, at the Mid-day Club, the new meeting headquarters.

The first meeting, designated as "Membership Night," officially opened the drive for new members. Chairman Clete Briner greeted the Chapter and guests and outlined the policies of A.S.T.E. and the business of the coming year.

The technical session was devoted to a talk, with a colored movie and illustrations, on the Forging of Shells by Mr. Harold D. Anderson of the Acme Division of the Hill Acme Company.

Dayton

The season of Fall and Winter meetings was opened by the Dayton Chapter on September 8 with a dinner meeting at the Gibbons Hotel. Chairman Polk introduced Earl Johnson who was elected Regional Director to represent Dayton and Cincinnation the Board.

After a brief business discussion, the meeting was turned over to Vice Chairman Howard MacMillan, who introduced the technical speaker, T. B. Buell, Sales Manager of the Sundstrand Machine Tool Company.

Mr. Buell gave a very comprehensive talk accompanied by slides and motion pictures on "The Machining of 75 mm. Shells" followed by an interesting discussion of details in processing.

Elmira

The Elmira Chapter held its monthly meeting at the Mark Twain Hotel on September 5. At 8 P.M., the meeting was called to order by Chairman C. D. Thomas. Mr. Thomas briefly stressed the "Semi-Annual Meeting" — Membership and delinquent dues. Secretary J. G. Menihan read sundry correspondence and reports received from Detroit and various other sources.



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Mr. Thomas introduced Mr. Herman Goldberg of R. G. Haskins Co. who delivered a practical talk on "Tapping of Materials used in Defense." Mr. Goldberg stressed the tremendous saving in proper application, sharpening and use of taps in the various alloy steels, illustrating his points with the use of a tapping machine and tapping grinder.

Golden Gate

San Francisco, the Golden Gate Chapter resumed its monthly meetings September 8 at the Engineers' Club in San Francisco. The meeting drew the largest attendance of any since the organization of the Chapter.

A colored film entitled "Inspecting a Messerschmitt 110 Fighter" was featured at the meeting. This picture was furnished through the courtesy of the Vultee Aircraft Company. Owing to the pressure of their production, they were unable to send a commentator as originally planned, but Mr. K. L. Bues, Chapter Chairman, was pressed into service and delivered a very fine talk on the design and manufacturing tolerance

of the German plane.

Hartford

Hartford Chapter has had its first Sheep Bake and, a huge success. Intentionally, it was not a large affair. Some one hundred members attended and had one swell time. While they were enjoying the various forms of amusement provided, they were conscious of the aroma of something out of the ordinary cooking.

At approximately one o'clock in the afternoon things began to get under way. A lively baseball game replete with razzing of umpires was one of the first activities. It proved so entertaining to the participants that, from an ordinary game, it progressed gradually to practically a "double-header". Estimates were that at least seventeen innings were played. Frank Bradley, although endangered many times by powerful batteries of the opposition, retained his mastery of the situation, and his team emerged victorious. George Schuster was the losing pitcher. Ronny Price, stellar third baseman of the Bradlev team, was the main spark in the infield with his faultless ball handling.

The dart game drew crowds most of the day. Apparently Henry Moore, local chapter chairman, was complete master of the game as he was never seen throwing under such pressure that he was forced to remove his coat.

All afternoon there was the constant chatter at the ball game, the rustle of cards at the picnic tables and the steady clank of horseshoes as ringer after ringer was piled up. Everyone seemed to be having such a good time that the dinner call had to be sounded several times. The food was delicious. The sheep was more nearly lamb, and was more nearly barbecued than baked. It came to the tables a rich, well-done brown in quantities that never ceased. No more tasty dish could have been prepared for a hungry crowd of men.

At the outing, besides the local members, were several members from nearby chapters including Frank Curtis, National President; Frank J. Oliver, Chairman of the New York—New Jersey Chapter; Mike Brennan, Chairman, Springfield, Massachusetts Chapter; Ed. Sheldon, Vice-Chairman of the Springfield Chapter; Harry E. Chellis, Vice-Chairman Southern Connecticut Chapter; Jack Callahan, Chief Inspector of the Springfield Armory; and Joe Ferri, Chief Inspector of American Bosch.

As the sun set most everyone went home. A few were seen still playing cards under the lights of the YD Club, but everyone was sure that the Sheep Bake at the grove in Plainville, Connecticut had been a real afternoon of good



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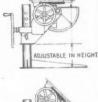
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for Chicago Rawhide tools.

fellowship preparatory to a busy season for the Hartford Chapter.

Milwaukee

The Milwaukee Chapter held its meeting on September 11 in the Republican Hotel, Milwaukee.

After an introduction by Chairman Heywood, the meeting was turned over to Julius A. Riedl, Vice Chairman, who spoke on the semi-annual meeting to be held in Toronto. Mr. Riedl then introduced Mr. Bautare of Racine, Wisconsin, as well as the other visitors who

were present.

Mr. H. E. Linsley who was then introduced, showed a sound picture, entitled "Construction and Manufacturing Processes of a Wright Cyclone 14-cylinder Air Current Engine." After the picture, there was a question period, during which Mr. Linsley elaborated on the pictures.

Peoria

The Peoria Chapter opened its 1941-1942 season on September 9 with a President's Night meeting at the CreveCoeur Club, at which National President, Frank W. Curtis, was the speaker.

The President's talk on "Tool Engineering" stressed the importance of the tool designer. The talk was supplemented with slides of Tool Design principles and photographs of practical applications. The group was particularly interested in the experience of Mr. Curtis' Company with induction hardening of small lots and single pieces, and questioned him extensively about it.

Pittsburgh

The opening meeting of the Pittsburgh Chapter was held at the Edgewood Country Club on Friday, September 5. A golf tournament was enjoyed by many of the members until a sudden summer thunderstorm broke up the festivities shortly before dinner time and thoroughly drenched quite a few of the players who were so unfortunate as to be caught far from the clubhouse. After dinner came the awarding of golf prizes, and an excellent tap dancing show put on by a group of professional entertainers. The speaker of the evening was Mr. H. K. McCook of Washington, D. C., Staff Member, Priorities Division, General Products Group of OPM. His topic was "Priorities and the Tool Engineer.'

Rochester

The Rochester Chapter opened the fall series with an open discussion meeting at the down-town Hotel Sagamore.

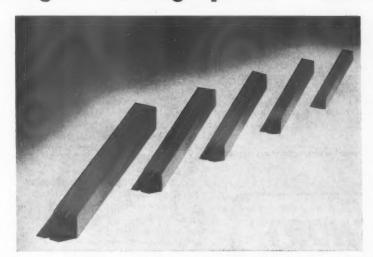
The picnic committee made a worth listening to report; namely, that money was not lost on their last summer's picnic venture. Congratulations are in order for picnic Chairman, Charles Seely. Jerry Sick, Camera Works, wins more recognition, as he was the picnic committee No. 1 ticket seller by the overwhelming ratio of 10:1 over the next highest dispenser. Why not a chrome plated tin cup for Jerry and Charlie Seely also?

An open discussion of ordnance problems followed the business reports with Al Fultz of Hawk-Eye Works taking the floor. Al discussed some of the Ordnance fire control gage problems his company is faced with in respect to manufacture. The three examples cited by him were of fixture type multiple position gages. Al described various types of gages that his department has laid out and asked for opinions from the floor. This resulted in a lively discus-

After the gage smoke had cleared, Sylvester Spain of Camera Works went into the screw machine parts manufacture as applied on Ordnance equipment at his plant. Syl's contribution was built both around small parts and



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medium size units now being processed. The finish of formed tools was given considerable time as was reamer design due to exacting tolerances from both size and the surface finish standpoint.

Shell manufacture had its inning also. R. J. Burnett of the Signal Works' Lyell Avenue shell plant took the floor after Spain finished his discussion. Burnett showed how different jobs showed radical departures in tool practices. He made a very interesting story about the form tool problems as related

to shell manufacturing. The principal point that he brought up was that the tools of most jobs remain individual in character.

A comparison of the old American National taper pipe thread and the new Army and Navy Air Corps taper pipe thread specification was made by C. G. Newton of Pratt & Whitney. The object of Newt's comments was to make clear that the present Air Corps taper pipe thread presents manufacturing problems far more exacting than the

conventional taper pipe jobs.

Rockford

The monthly meeting of the Rockford Chapter was held at the Faust Hotel, Rockford, on September 11. The Chapter celebrated the fourth annual birthday meeting with Mr. Henry Ruehl, Chapter Chairman presiding.

Dinner was served at 6:30, during which time the members were entertained by Mr. Howard Linstrom, tenor, and Mr. Ralph Riverdahl accompanist. Following the dinner, Hank Ruehl welcomed Frank Curtis, National President, and presented a gavel in token of appreciation of the Rockford, Peoria and Tri-Cities Chapters.

Frank Curtis talked on the subject of "The Right and Wrong in Tool Design", illustrating important facts with slides. Mr. Curtis brought out the Tool Engineers' slogan "Use Origination." Mr. Curtis' talk was received with a great deal of enthusiasm.

Schenectady

The Schenectady Chapter held its first meeting of the fall season on Thursday evening, September 11, in Rice Hall at the General Electric plant in Schenectady. Mr. Charles E. Wilson, President of the General Electric Company, in an address to the 300 members and guests present, paid high tribute to the large and important part undertaken by Tool Engineers on the job which lies before industry today.

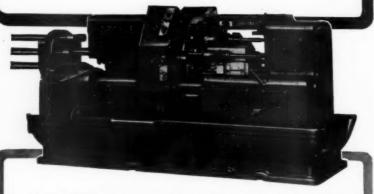
Preceding Mr. Wilson's talk, the Chairman introduced Ray Morris, Second National Vice President, who briefly outlined the rapid growth of the Society, both in Chapters and members and asked each member to help his Chapter in building up its membership with qualified men. Mr. Morris also outlined the program of the Semi-annual meeting to be held in Toronto in October and encouraged members to make their reservations early so that plans for plant visitations can be satisfactorily arranged.

At a short business meeting, presided over by Chapter Chairman Al. Schuneman, reports were presented by various officers of the Society. An outline of coming activities was given by Program Chairman Harry Crump which indicated a very interesting year ahead.

Springfield, Mass.

The Springfield Chapter held its first meeting of the fall season on September 8 at the Highland Hotel, Springfield, Mass. After dinner a coffee talk was given by William P. Murphy, Curator of the Springfield Armory Museum. Mr. Murphy gave a talk on the complete history of military fire arms and had exhibits with him that ranged from the

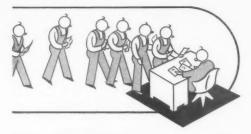
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The Hammond "4" Chip Breaker Grinder (right) is a specialist ... gives you complete Carbide Tool maintenance in one versatile combination. Right side grinds vital chip breaker grooves into Carbide tips, adjusting to any angle with the exclusive Hammond double cradle vise. Right side rough or finish grinds with a 6" cup wheel. An amazingly accurate, unbelievably sturdy machine . . . heavily built throughout for real service. Every plant needs one. Bench or floor models. Write for Bulletin TODAY!



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earliest muzzle-loading type of pistol to the modern garand rifle with which our troops are now being equipped. He completely disassembled the garand rifle without the use of tools. Later on, being challenged to reassemble it, he accomplished this also without the use of tools, in 45 seconds. His talk was most interesting and his exhibits attracted a great deal of attention from the members.

Mr. Murphy's talk was followed by a talk by Ray Morris, Second Vice President, who forecast the semi-annual meeting at Toronto, and urged all who planned to attend to notify their Chapter's officers well in advance.

I. F. Holland, Regional Director, also spoke for a few minutes.

The hi-light of the evening came when Mr. John Haien of the Chrysler Corporation was introduced and gave a most interesting talk on the Youth Training Program for the sons of Chrysler employees and also spoke on the general Chrysler training program in which he is training 10,000 men to build bombers. In their training school they are taking

boys from 10 to 18, putting them under the instructions of expert mechanics from the Chrysler plant, dealing with small groups, and teaching the boys to work with their hands and above all they are instilling in them the pride of accomplishment.

Twin States-(Springfield, Vt.)

The first meeting of the A.S.T.E. Twin States Chapter was held on September 12, at the Masonic Temple in Springfield, Vermont. Following a delicious chicken pie dinner, served by the ladies of the Eastern Star, a talk was delivered by Mr. Robert Beardsley on the Comparator and its applications. Mr. Beardsley has been connected with the development of this inspection device since its invention by Mr. James Hartness. The use of reflection for inspecting pieces such as type face was an unsuspected revelation to most of us who had thought of the comparator as suited only to shadow projection. A standard comparator was on the floor. It was used for specific demonstration to supplement the slides prepared by the Jones & Lamson Machine Company for explaining their machine.

Mr. Frye of the Delta Products Company presented a sound film showing many interesting applications of the Delta tools in relieving bottlenecks. This was unexpected and followed the regular program at which Mr. Wilbur Handy presided. Nearly all the men remained to see Mr. Frye's pictures and they felt well repaid—for his pictures were a grand addition to the program.

It was announced that the October meeting will consider the subject of Molybdenum steels.

St. Louis

The monthly dinner meeting of the St. Louis Chapter was held at the Melbourne Hotel, September 11. Chairman Burnside introduced a large number of new members and announced that the Chapter had a very healthy treasury as the result of a financially successful picnic. The business session was suspended for a half hour while the members listened to the radio speech of President Roosevelt. The technical session opened with a sound movie by Allegheny - Ludlum Steel Corporation "There's a job to be done." This was followed with an excellent talk by Col. Bliss of the O.P.M. on Purchases, Priorities, and Defense. The meeting closed after the showing of the Picnic movies.

Syracuse

The officers and committee chairmen have been busy during the past months rounding into shape the activities for the next year. Ray Adams, our Chairman, has given good counsel to all his



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Midwest was founded on the premise, that customer relationship shall be more than simply supplying a product; that his particular cutting problem, studied and analyzed, and solved with tools designed and manufactured to fit the conditions, is rendering him an actual service.

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committee men and the results are proof of his splendid leadership. Our monthly meetings will be interesting and educational. Clayton Ainsley and Bert Mitchel reported at the September meeting that a full list of speakers for the season is assured covering subjects of diversified interest to the Tool Engineer and shop executive.

Don Babcock has signed up new members but has not exhausted available material. Evidence of the work of Larry Kirk, our Chairman of Entertainment, is given below. The regular meeting of the Syracuse Chapter held on September 9 at the Onandaga Hotel in Syracuse brought together for dinner a genial bunch of fellows. Neither the refreshments taken before dinner, nor the removal of coats was very effective in circumventing the hot weather. Larry Kirk said that the American Society for Metals which was meeting in another part of the hotel was responsible for the heat.

Due to current production of defense orders in many Syracuse plants, the speaker invited was L. W. Dwyer, Chief of the Gaging Section at the Watervliet Arsenal. He gave an illustrated lecture on "Interchangeable Manufacture Covering Engineering Drawings and Gaging Methods Relating to Ordnance." Mr. Dwyer is the author and supervisor of the basic gage course used for training ordnance officers and civilian inspectors and is also responsible for the installation of ordnance gage laboratories that have been set up throughout the country.

Upholding the brief tradition of the Syracuse Chapter, Larry Kirk with the help of Willard Parish and Bert Mitchel put over successfully our fourth annual clambake. To the others on the committee and to all who helped to make the day a success, go our praise and thanks. We should mention in this connection the work of Jerry Smith in running the chuck-o-luck game. He is an artist in convincing the boys that the game can be beaten. We wonder how he made out later in a private game of chance. The gang gathered early on Saturday afternoon, Sept. 6, at Hinerwadel's Grove. The weather was perfect. Three hundred sixty-eight members and friends attended. Some of the out-of-town guests we noticed were Messrs. Shaver and Ahern of Binghamton, Booth of Utica, Becker from Rochester, Messrs. Denson and Rundell from Montour Falls, and Rodgers and Wagner from Geneva.

The first place visited was the bar for refreshments and the exchange of greetings. For diversion there was softball, games of "5 and 10", dice, and numbers game for those who felt lucky; also horseshoe pitching and a seemingly inexhaustible supply of clams and suds. Musicians were handy to accompany those in the mood for a song.

About four o'clock dinner was served. Steamed clams, broiled chicken, corn on the cob, potatoes and the trimmings were served in copious quantities. After the dinner, Chairman Adams conducted the drawing for prizes. Members and friends were generous in their contribution of sixty-seven prizes. J. R. Stewart and C. R. Gibbons each contributed five prizes. H. A. Smith donated a toastmaster hostess set. There was an assortment of electric clocks and gift certificates, liquor, sporting goods, jewelry, a garden hose, an elaborate picture and others - for which acknowledgment was made to the donors. Among prize winners were M. W. Denson; H. W. Smith; Charles Allen, Clayton Ainsley and his henchman, Marty Berry. Six Brown-Lipe-Chapin men won prizes, eight from Allen Tool.

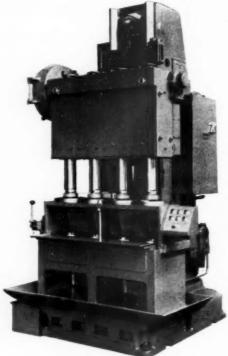
In view of the number of men attending from these organizations, the odds were in their favor. Honors in regard to attendance go also to the American

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Anyone can play a violin, but the real masters of the art—those who can do it as it should be done without squeaks and squawks—are few in number. The performance of those few artists is outstanding always, because practice and experience have given them what it takes.

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Moline No. 115 Cylinder Borer

ingly and continuously—are not found everywhere. Moline cylinder boring machines are backed by 40 years of practice and experience, and they have what it takes.

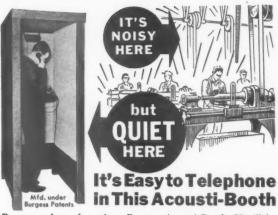
Therefore, when you think of cylinder boring, you think also of Moline machines.

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There are no mechanical parts—hence no maintenance is required. Always easy to keep clean. Send coupon for full details.

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Locomotive group, Crouse-Hinds, Onandaga Tool Company, Carrier Corporation, W. C. Lipe, Crucible Steel, and to Knise & Krick, the last mentioned attending 100%.

Western Michigan

Grand Rapids, the Western Michigan Chapter held its first fall meeting of the 1941 season on Monday, September 8, at the Browning Hotel in Grand Rapids. The Chairman of the program committee announced that this meeting would be more or less an open meeting to discuss the plans of the Chapter for the coming season. Mr. Monahan opened this session with a welcome to all the out-of-town guests, and continued with a short talk on "What is Tool Engineering" and the purpose of the Society in the engineering field. A communication from Secretary K. Butterfield, now in the Service as Ammunition Supply Officer at Camp Davis, was read by the Secretary. The communication listed supplies and ammunition now being received and the part Tool Engineering plays in the army. An open discussion

was held on defense work, the strong competition, the inspection of completed orders, and the organizing of small industries into one group to bid on Government orders.

The meeting was closed, following forty minutes of sound and color movies on the Magic of Modern Plastics. There was also a short film on the construction of plastic molding machines. These were sponsored by "Modern Plastics" magazine.

It was announced that the main speaker of the October 13 meeting would be H. A. Frommelt, Director of Industrial Research of the Kearney & Trecker Milling Machine Company. His topic will be "Milling Machines as applied to the Production of Plastics in Defense Work." The meeting will be held in Muskegon.

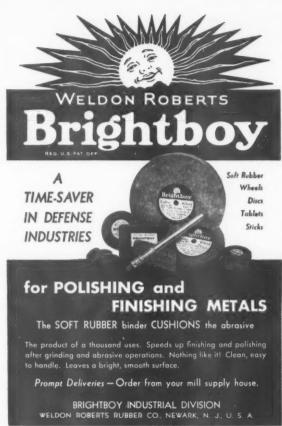
Worcester

The first meeting of the new series started with a bang. A short business meeting was held. All A.S.T.E. members who will be in the vicinity of Worcester on October 13 are invited to attend the meeting on that night to hear Ralph Flanders, President of Jones & Lamson. Also, on November 15 there will be a joint meeting with the American Society of Metals. The Worcester Chapter was honored with the presence of John Sylvester, Bill Young, and E. J. Johnson of the Boston Chapter. They are a prosperous looking group and a happy one too-welcome anytime boys! There were also some new and real good looking faces - Mr. Almond Draper, Al. Warman, Mr. Thompson and Mr. Ed. Graham. Glad to see you all and come again. From distant Athol came our good friends Doc. Fraser and Harry Butler, Grover and Arthur were still resting from Saturday.

Mr. A. H. d'Arcambal, Past President of our National Chapter and Consulting Metallurgist of the Pratt & Whitney Division, Niles-Bement-Pond Company of Hartford, Connecticut, gave a very appropriate and enlightening talk on "Machining of Metals" and "Selection, Use and Care of High Speed Steel Cutting Tools." In the short course of an evening, d'Arc gave information that he and his associates accumulated over a number of years. For those who would like to review the remarks, a section may be found in the June 1940 issue of THE TOOL ENGINEER and also in a recent issue of the American Machinist.

Would you like to increase reamer life 100% or more? Are you having trouble machining No. 1020 steel or manganese? Are you climb milling? Are you interested in saving money for you or your company? These and many more questions are answered by Mr. d'Arcambal in his talk which he illus-









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Yes sir, Mr. Tool Engineer, this flexible reliable speedy indexing fixture is so positive that even unskilled operators can use it on production work. Because it is so accurate—even under heavy cuts, your unskilled operators can use in milling and drilling machines, slotters and planers—at faster speeds and feeds. Ideal for the tool room—no modern shop should be without this excellent tool.

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trated with slides. d'Arc was also ably assisted by Mr. Jim Law, Tool Engineer of Pratt & Whitney. If you can't get to hear d'Arc. read the articles.

The Worcester Chapter had its first Outing at Toy Town Tavern, Winchendon, Mass. There were ninety for dinner and sixty played golf while others played croquet and some just sat down and enjoyed the beautiful panorama from the veranda of the Tavern. The weather was perfect and the crowd was on par with the weather. Talking about par, Mr. Carpenter showed the boys how to play golf with a nice 77 score. There were many prizes, and the big prize, a

set of four woods, went to Mr. Packard of the Worcester Chapter. Boston, Hartford, Vermont and even New York were represented. Eugene Roth came all the way from New York to be with the boys. Arthur Starrett was sadly missed as he had to attend his son's wedding. He would not let the boy postpone the wedding-one can get married any day but one does not have a Tool Engineers' Outing every day. However, Arthur could not see it that way, so to get back at Arthur for not coming and taking his beating at golf like a man, George Grover invited the world to come and drink a toast to the Starrett Company

at Arthur's expense.

York

The York Safe & Lock Company night with A.S.T.E. was celebrated by York Chapter on Tuesday evening Sept. 9.

Lieutenant R. N. Scarlett, Chief of the Ordnance Division for the York Safe & Lock Company gave an interesting and instructive talk on the use of gages in Ordnance work.

Mr. J. D. Treathaway, Sales Eng. Cerro De Pasco Corporation, gave a lecture on the application of Bismuth Alloys for industrial purposes. On September 26th, the First Annual Ladies' Night Entertainment will be held by the York Chapter. According to Ivan Grass & George Ryder, Meetings & Entertainment Committee Chairmen, this is expected to be one grand night of pleasure.

—PRIORITY CONTROL— (Continued from page 90)

sary uses, and instructed the Executive Director to seek to bring that reduction into effect. It also ordered a study of plans to increase domestic production through a variety of methods for getting greater production out of existing American mines."

From all indications, it appears that the production of defense materials will be pushed to an increasing percentage of this country's national productive capacity. All industry engaged in defense production will be able to get all required materials for their production, with some shortages possible in isolated cases.

This steady flow of materials to defense industry will be assured by the priorities system, and if shortages appear likely to develop in materials for defense, these shortages will be made up by further cuts in civilian goods production.

From these implications, it is apparent that civilian industry will be deprived of practically all scarce metals. Only a small amount of secondary aluminum is going to civilian industry; nickel will be hard to get for civilian uses; copper is becoming increasingly tight on civilian supply.

Civilian industry will be faced with the need of finding substitute materials, and simplification of design and reduction in the number of models will be necessary. The processes of conservation and simplification are for the purpose of reducing in one case the amount of materials going to





small parts.

waste, and in the second, the amount of materials used in various goods produced for civilian consumption.

However, the total savings in materials from these two expedients, while considerable, will not eliminate the necessity for further sharp curtailments in production if a complete defense economy is to be reached.

Handling Displaced Labor

An important factor in the curtailment of civilian production is the problem of reemploying labor that is displaced. Sudden shutdowns due to lack of materials in civilian goods plants would create a serious unemployment problem, as defense industry could not absorb the large segments of labor in a short space of time. In Britain, the problem was not so acute in view of the fact that the armed forces absorbed a major portion of labor released through the diversion of civilian production into defense.

The rationing of materials to industry constitutes a problem of major importance, ranking in importance almost to the degree of the Number One problem of expediting defense.

To properly ration materials, there first will be required a national inventory of stocks held in various industries. The Census Bureau of the Department of Commerce is conducting what amounts to a national inventory of stocks of all important raw materials, ranging from bristles to tin.

In addition, the defense organization is undertaking a survey of the requirements of the Army and Navy, as well as the Lend-Lease and Defense Aid programs. When the material requirements of these programs are determined, the remainder that will be available for civilian industry will be known, and as a result, industry generally will be in a better position to schedule production.

Wendell Whipp Honored

Wendell E. Whipp, president of Monarch Machine Tool Co., Sidney, O., was honored at a surprise party staged by 34 long-time employees recently as the company completed its 25,000th engine lathe. Whipp was presented with a bronze plaque of the plant bearing the names of all those who have been with the company more than 20 years.



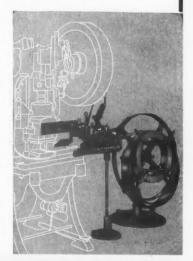
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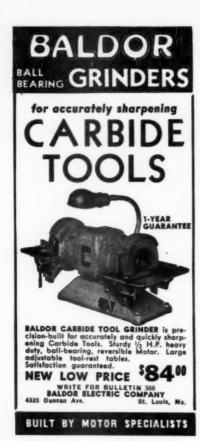
Wittek Automatic Roll Feeds provide an improved and simplified method of punch press operation that insures rapid feeding under all conditions. Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions.

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The Passing Parade

Kenneth Nelson Atwater, who for the past few years, has been engaged in both the production and sales of plastic materials for the Rohm and Haas Company, Philadelphia, has been appointed general manager of the Pro-phy-lac-tic Brush Company, Florence, Mass. A native of Newark, N. J., Mr. Atwater, who is considered one of the leading authorities on plastic molding in the country, was graduated from Brown University in 1917, where he majored in the study of chemistry. He served in the U.S. Army two years, 11 months of this period seeing service in France. Following the war, Mr. Atwater was associated with the Celluloid Corporation in Newark. He held a position there for nine years and then accepted a post with the American Cyanamid Company of New York, where Eurea plastics are made. For eight years he was general manager of a plastic department with American Cyanamid.

Daniel Simonds has been elected chairman of the board of directors of Simonds Saw & Steel Co. Fitchburg, Mass., succeeding his father, Alvan T. Simonds who died recently. Gifford K. Simonds Jr. has been elected general manager.

Alfred La Pierre has resigned as superintendent of plant No. 2 of the Greenfield (Mass.) Tap and Die Corp. He was formerly superintendent of the concern's Detroit plant and has been in Greenfield a year. W. A. Addis has been appointed acting superintendent.

S. S. Bowren, formerly sales manager of the Hunter Arms Co., Fulton, N. Y., has been named sales manager and director of advertising for Harrington & Richardson Arms Co., Worcester, Mass.

Herman Nova, formerly vice president and manager of the Shambow Shuttle Co., of Woonsocket, R. I. has been elected president and treasurer of the Clark Machine & Foundry Co., of Franklin, Mass. The company, which has been in business since 1860 does general machine shop and repair work, specializing in machinery used in shoddy and felt manufacturing.

Alfred C. Fuller, president of Fuller Brush Co. has been nominated for the presidency of the Connecticut Manufacturers' Association to fill a vacancy caused by the death of E. Kent Hubbard. The association will act on the nomination in October or November. Until Jan. 1, John H. Goss, president of Scovill Manufacturing Co. of Waterbury, Conn., will assume the duties of president.

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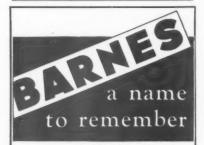
1" Collet Capacity—Ball or Roller

Bearing
No. 88 U-1136 WQ Sheldon 11" swing 36" between
centers pre-loaded ball-bearing spindle, hardened
and ground all over, inside and out with 1½" hole
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motor drive, and telescopic taper attachment.

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Our production of Barnes Hack Blades and Metal Cutting Band Saws conforms to the stand ards approved by O.P.M. August 20, 1941.

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PASSING PARADE-

Leonard C. Davis has been named sales manager of the small arms division of the Colt's Fire Arms Mfg. Co., Hartford, Conn. For the past 13 years, he has been advertising manager of the Colt concern.

On October 1st Otto W. Winter will assume the duties of Vice-President in Charge of Manufacturing of the Republic Drill and Tool Co. of Chicago, newly organized manufacturers of high speed twist drills, employing about 300 workers at this time. Mr. Winter, has, also, been elected a member of the Board of Directors of the Republic Company.

Twenty years ago in a small garage J. Hugo "Pop" Smith founded what is now the Wesson Company, nationally known Detroit manufacturer of Tungsten Carbide and high speed cutting tools. Recently the 200 devoted employees of the



Wesson's Hugo Smith The model stood six feet.

Company threw a surprise Farewell Party for retiring president "Pop" Smith. The employees presented Mr. Smith with a six-foot model of the old tea-trade sailing vessel, "The Southern Cross" and a plaque inscribed: "In Memory of By-Gone Days, To J. H. Smith, From the Boys of the Wesson Company".

The Oilgear Company, Milwaukee announces the appointment of Mr. W. G. Prasse, formerly Eastern Representative, as Sales Manager of this Company.

W. G. Nuelsen, President announced recently that the name of L. J. White Co., has been officially changed to Kalite Products, Inc. No change in management or personnel is involved.

Mr. Lawrence K. Blackman, Assistant Treasurer of Farrel-Birmingham Company, Inc., Buffalo, New York, retired from active service on September 1 after 43 years of continuous service with the company.

Ray P. Tennes, who for the past seven years has served as a Director and Secretary-Treasurer of the Shafer Bearing Corporation, has been elected Chairman



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-PASSING PARADE

of the Board of Directors. Mr. Tennes succeeds his Father, the late M. J. Tennes, who served as Chairman of the Board since 1930. Ray P. Tennes is the eldest of the three sons, all whom are officers and directors of the Corporation. In addition to his position as Chairman of the Board, Mr. Tennes will continue as Treasurer of the Corporation. W. L. Kinnaw, Comptroller of the Corporation, has been elected Assistant Treasurer—Assistant Secretary.

M. J. Tennes, Jr. is President of the Corporation and is now on leave of absence, serving as Captain in the U. S. Army Air Corps. J. F. Ditzell is Vice-President-General Manager of the Corporation

Eugene E. Everett, formerly with Muncie Gear Works as Process Engi-



Holden's Everett A metallurgist still.

neer & Metallurgist, has joined the A. F. Holden Company in the same capacity.

Mr. Coolidge Sherman has been appointed Eastern Sales Manager of the Allegheny Ludlum Steel Corporation, Pittsburgh, according to announcement made today by R. M. Allen, General Sales Manager of the Company.

Creation of an Industrial Relations Department with James Leslie Goddard as Manager is announced by the Plomb Tool Company. The new department has been formed to meet the needs of rapid company growth as they relate to personnel plans and development, and public relations.

Hugh A. Scallen, 46, District Manager of the New England branch and warehouse of the Jessop Steel Company, with offices at Hartford, Conn., died suddenly from a heart attack on September 2nd while driving his automobile. Death was due to natural causes.

Sheldon Machine Co. are now located in their new factory at 4240-4258 No. Knox Avenue, Chicago, Illinois.

D. W. R. Morgan, George P. Passmore, and A. P. Craig will supervise increased expansion and production ac-

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The Everede Boring Bar Holders are adjustable to fit various size lathes. (Bushings are furnished with each boring bar for use in the Holders.) Everede Holders keep the boring bar in a horizontal position, regardless of any change in the size of the lathe, within limits.

The No. 1 Boring Bar Holder is used on precision bench lathes from 7" swing to and including 9".

The No. 2 Holder is used on engine lathes from 8" swing to and including 12", and the Ne. 3 Holder on engine lathes from 12" swing to and including 24".

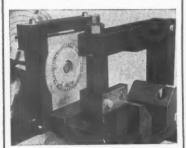
The Holders are made of case-hardened alloy steel. A tool post block is attached to the engine lathe Holders by a chain as shown.

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PASSING PARADE

tivities in the Westinghouse Electric and Manufacturing Company's South Philadelphia works. These new appointments were announced by R. A. McCarty, Vice President.

The Keystone Carbon Company has just completed a large addition to their factory in Saint Marys, Pa. The new wing will be used for the manufacture of brushes and porous bronze bearings. A considerable increase in production is predicted.

At a recent election of officers of the Niagara Machine & Tool Works, Buffalo, N. Y., George E. Munschauer was made Treasurer and Elmer D. Heinz Secretary. Both Mr. Munschauer and Mr. Heinz have been connected with the Corporation for many years in executive capacities.

Richard P. Swartz, Vice President of Crown Can Company, Philadelphia, has been promoted to the special post of Assistant to the President.

Effective September 1st, 1941, Mr. S. A. Harris has been appointed Eastern Regional Manager of the Detroit Rex Products Co.

Anders Petterson is the new Chief Engineer of the Giern & Anholtt Tool Co. Inc., Detroit, Mich.

Albert E. Newton, 63, vice president and general manager since May, 1921, of the Collins Company, Collinsville, Conn., internationally known manufacturers of edge tools, died suddenly in the factory office Sept. 23. Mr . Newton. who has been president of both the National Metal Trades Association and the National Machine Tool Builders Association was responsible for the entire revamping of the Collinsville factory plant. After his return from the war he became general manager of the Reed-Prentice Company of Worcester, Mass., manufacturers of machine tools, remaining there until 1920.

Peter Stewart, 65, assistant manager of operations of the American Steel & Wire Co. in the Worcester, Mass. District, died suddenly Sept. 10 as he prepared to go to work. He entered the employ of the American Steel & Wire Co. as a timekeeper in 1900. He advanced steadily through positions of increasing importance, first in the electric cable and open hearth departments, until achieving one of the company's outstanding executive positions in the region.

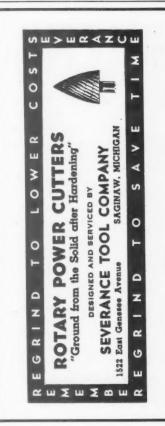
Alvan Tracy Simonds, 64, president of the Simonds Saw & Steel Company of Fitchburg, Mass., authority on steel-making and a pioneer advocate of the study of economics by business executives and all high school pupils, died Sept. 2 at his home in Jamaica Plain, Mass.

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NEW YORK

OCTOBER MEETINGS

BINGHAMTON — Oct. 1. 7 P.M. Hotel Sherwood, Greene, New York. Frank W. Curtis will speak on "Tool Engineering".

BUFFALO—Oct. 16. 6:30 P.M. University Club. Speaker, A. T. Colwell, Vice President of Thompson Products. Topic: "Behind the Scenes in National Defense Engineering".

CHICAGO—Oct. 6. 6 P.M. Midwest Athletic Club, Hamlin and Madison. \$1.25 per plate, 50c admission to the Technical Session for non-members. Louis Biehler, Asst. Supt., Aircraft Division, Pullman Standard Car, will give an illustrated talk on "Multiple Sheet Profiling and Forming by Rubber." Motion picture—"Onsrud"—dealing with metal cutting machines for the aircraft industry. Dinner reservations, Mr. Croft, Van Buren 8200.

HAMILTON, ONT.—Oct. 9. 6:30 P. M. Royal Connaught Hotel. H. A. Frommelt, Director of Industrial Research, Kearney & Trecker Corporation, will speak on "Plastics in National Defense".

PEORIA—Oct. 7. 6:30 P. M. Creve Coeur Club, Erik Oberg will talk on "Voluntary Economic Methods Versus Compulsory Systems in Industry".

PITTSBURGH — Oct. 3. 6:30 P.M. Gulf Research and Development Laboratory, Harmarville. Speaker: W. H. Wills, Chief Metallurgist of the Allegheny Ludlum Steel Corp. Subject: "Molybdenum and Hi Speed Steels".

SPRINGFIELD, MASS.—Oct. 13. Dinner at 6:30 P.M. Highland Hotel. Speaker: H. M. Richardson, Chief Engineer, Plastics Department, General Electric Company. Movies of the annual clambake will be shown. Reservations: Mr. W. Suk.

ST. LOUIS—Oct. 9. 6:30 P.M. Melbourne Hotel, Grand and Lindell Avenues. The speaker will be announced later.

SYRACUSE—Oct. 14. Dinner at 6:30 P. M. Onandaga Hotel. Technical session, 8:00 P.M. Speaker: C. R. Staub, Chief Engineer, Michigan Tool Co. Subject: "Shaving and Lapping Gears."

TRI-CITIES—Oct. 8. 6:30 P.M. Le Claire Hotel, Moline, Ill. Erik Oberg will speak on: "Voluntary Economic Methods Vs. Compulsory Economic Systems". Reservations: L. J. Rodgers, c/o Deere and Mansur Works, Moline.

WORCESTER—Oct. 13. Dinner 6:30 P. M. Empire Room, Putnam and Thurston's Restaurant. Ralph E. Flanders, President, Jones and Lamson Machine Company, will speak on "Tooling For Defense".

ROCKFORD—Oct. 9. Faust Hotel. Speaker: Erik Oberg. Topic: "Our Jobs and Current Events."

WESTERN MICHIGAN — Oct. 13. Muskegon. Speaker: H. A. Frommelt, A LaSalle Design

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MODERN COLLET and MACHINE CO. 407 Salliotte St. . Ecorse, Mich. Director of Industrial Research, Kearney and Trecker Milling Machine Co., Inc. Topic: "Milling Machines as Applied to the Production of Plastics in Defense Work."

DAYTON—Oct, 13. Frank Curtis, guest of honor and principal speaker. Chairman "Whitey" Poock will be assisted by Past Chairman G. A. Goodwin and Earl Johnson.

HARTFORD — Oct. 6. 8:00 P.M. Hartford Gas Co. Auditorium. Speaker: Richard F. V. Stanton, Contract Dept., Pratt & Whitney Div. Niles Bement Pond Co. Subject: "Basic Considerations For Contracting Defense Machine Tools." Reservations: Henry A. Rockwell, Hamilton Std. Propeller Div. United Aircraft Corp.

MILWAUKEE — Oct. 9. Republican House. Speaker: Louis M. Benkert, General Manager, Progressive Welder Co., Detroit. Subject: "Welding For the Tool Engineer." Illustrated.

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Acme Industrial Co		Gallme
Ajax Steel & Forge Co		Gammo
Allegheny Ludlum Steel Corp.	106	Garriso
American Broach & Machine C American Chain & Cable Co.	50 71	Giern &
American Chain & Cable Co.	, Inc 105	Gisholt
Ames Co., B. C.	103	
Ampco Metal, Inc.	120	Glenzer
Apex Machine & Tool Co., Th	ie117	Gordon
Armstrong-Blum Mfg. Co.	108	Greenfi
Armstrong Bros. Tool Co	92	Greenle
Ampco Metal, Inc. Apex Machine & Tool Co., Th Armstrong-Blum Mfg. Co. Armstrong Bros. Tool Co. Atlas Press Company	132	
		Hammo
Baker Brothers, Inc.		Hanna
Baldor Electric Co.	134	Hannifi
Barber-Colman Co.	21	Hartfor
Barnes Co., W. F. & John	29	Haskins
Barnes Co., Inc., W. O.	135	Haynes
Barber-Colman Co. Barnes Co., W. F. & John Barnes Co., Inc., W. O. Barnes Corp., John S. Bathlaher Stad Co.	125	Heald
Berhiehem Steel Co. Black Drill Co., The Blanchard Machine Co. Boyar-Schultz Corp. Bradford Machine Tool Co. Brewster-Squires Co. Brown & Sharpe Mfg. Co.	16	Hobart
Black Drill Co., The	99	Hole E
Blanchard Machine Co.	104	Holo-K
Boyar-Schultz Corp.	109	
Bradford Machine Tool Co.	80	Illinois
Brewster-Squires Co	109	Indepe
Brown & Sharpe Mfg. Co	3rd Cover	Ingerso
Burgess Battery Company		Borg
		Interna
Campbell Division, Andrew C		
American Chain & Cable C	Co., Inc 105	Jarvis (
Carboloy Co., Inc.	24	Jefferso
Carpenter Steel Co., The		Jones 8
Carboloy Co., Inc. Carpenter Steel Co., The Cerro de Pasco Copper Corp	105	
Unicago Kawnide Mrg. Co.		Kearne
Chicago Wheel & Mfg. Co.	92	Kent-O
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Cincinnati Grinders Inc.	44	Koebel
Circle Tip Tool Co. Cleveland Automatic Machin Climax Molybdenum Co. Columbia Tool Stool Co.		
Cleveland Automatic Machin	e Co., The. 91	Landis
Climax Molybdenum Co	67	LaSalle
Columbia Tool Steel Co		LeBlone
Columbia Tool Steel Co. Comtor Co., The Continental Machines, Inc.	79	The
Continental Machines, Inc.	87	Lee Co
Crucible Steel Company of A		Lewthw
Crucible Steel Company of A	merica . 14, 15	Lincoln
Cullen-Friestedt Co.	121	Lipe In
Cullen-Friestedt Co. Cunningham Co., M. E. Cushman Chuck Co., The	137	Logans
Cushman Chuck Co., The	112	Lovejo
		Lufkin
Danly Machine Specialties, Ir	nc. 139	LUIAIII
Davis Boring Tool Division	90	Machin
Dearborn Gage Co.	127	Machin
		Mackli
Detroit Power Scrawdriver Co	96	Majest
Detroit Power Screwdriver Co Detroit Stamping Co. Dia-Tool, Inc. DoAll Company, Inc., The	109	Matthe
Dig-Tool Inc.	129	McCro
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Hammond Machinery Builders, Inc. Hanna Engineering Works Hannifin Mfg. Co. Hartford Special Machinery Co., The Haskins Co., R. G. Haynes-Stellite Co. Heald Machine Co., The Hobart Brothers Hole Engineering Service Holo-Krome Screw Corp.	125 116 44 131 123 34 83 134
Illinois Tool Works Independent Pneumatic Tool Co. Ingersoll Steel & Disc Division, Borg-Warner Corp. International Nickel Co., Inc., The	17 76 85 32
Jarvis Co., The Chas. L. Jefferson Machine Tool Co. Jones & Lamson Machine Co.	84 99 33
Kearney & Trecker Corp. Kent-Owens Machine Co. Knight Machinery Co., W. B. Koebel Diamond Tool Co.	88 138
Landis Tool Co. LaSalle Designing Co. LeBlond Machine Tool Co., The R. K	118
Machine & Tool Designing Co. Machinery Manufacturing Co. Macklin Co. Macklin Co. Majestic Tool & Mfg. Corp. Matthews & Co., Jas. H. McCrosky Tool Corp. McKenna Metals Co. Mead Specialties Co. Micromatic Hone Corp. Mid-West Tool & Mfg. Co. Modern Collet & Machine Co. Moline Tool Co. Monarch Machine Tool Co., The Monarch Steel Company Morey Machinery Co., Inc.	117 142 95 127 96 98 136 6, 7 126 139 128 20 74
89, 92, 103, National Acme National Broach & Machine Co.	

National Tool Salvage Co. 137 National Twist Drill & Tool Co. 137 Nielsen, Incorporated 107 Norton Company 35, 36	7176
Oilgear Company 12: OK Tool Co., The 10: Oster Mfg. Company, The 10, 1: Ott Machinery Sales, Inc. 13: Ozalid Products Division 3:	3 1 9 8
Parker-Kalon Corp. Pioneer Engineering & Mfg. Co. 8 Potter & Johnston Machine Co. 3 Pratt & Whitney Div. 2nd Cover Procunier Safety Chuck Co. 11! Producto Machine Company, The 11 Putnam Tool Co. 9	497 1517
Racine Tool & Machine Co. 9 Ready Tool Company 11 Ross Operating Valve Co. 7 Ruthman Machinery Co., The 13	3 5 7 9
Schauer Machine Co. 13 Scully-Jones & Co. 66 Sellers & Co., Inc., W. M. 97 Seneca Falls Machine Co. 2 Severance Tool Mfg. Co. 13 Shakeproof Lock Washer Co. 11 Sheffield Corp., The 77 Sheldon Machine Co., Inc. 13 Skilsaw, Inc. 13 Skilsaw, Inc. 13 Smit & Co., Inc., Anton 97 Smit & Sons, Inc., J. K. 9 South Bend Lathe Works 2 Specialties Manufacturing Co. 97 Standard Gage Co., Inc. Starrett Co., The L. S. 66 Strippit Corporation, The 13 Stuart Oil Co., Ltd., D. A. 7 Sundstrand Machine Tool Co. Sunnen Products Co., Inc. 99	97578250417112305
Tannewitz Works, The 11 Tungsten Electric Corp. 11 Union Carbide & Carbon Corp. 3 Universal Engineering Co. 95, 10 United States Drill Head Co. 13	
Vanadium-Alloys Steel Co. 1st Cov. Van Norman Machine Tool Co. 12, 1 Vascoloy-Ramet Corp. 1 Victor Machinery Exchange, Inc. 14 Vinco Corp. 11	9
Warner & Swasey Co. Weldon Roberts Rubber Co. 13 Whistler & Sons, Inc., S. B. Wilson Mechanical Instrument Co. Wittek Mfg. Co. Wood & Spencer Co., The	11333377
Zeh & Hahnemann Co	29

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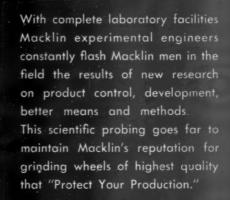
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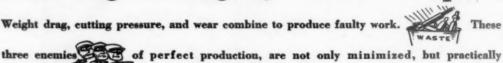
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